PB86-172533

Superfund Record of Decision (EPA Region 3) Sand, Gravel and Stone Site, Elkton Cecil County, Maryland, September 1985

(U.S.) Environmental Protection Agency
Washington, DC

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U.S. Department of Commerce
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EPA/ROD/R03-85/015
September 1985

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EPA

Superfund Record of Decision:

Sand, Gravel & Stone, MD

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Sand, Gravel and Stone site consists of approximately 200 acres, and is located in Elkton, Cecil County, Maryland. The site was previously operated as a sand and gravel quarry under the name Maryland Sand and Gravelstone Company. Currently, the site is occupied by the Sand, Gravel, and Stone Company. It was reported that about three acres onsite were used for the disposal of waste processing water, sludge, still bottoms, and about 90 drums of solid and semisolid waste between 1969 and 1974. On July 16, 1974, 1,300 gallons of flammable products in drums were reportedly received and dumped. On August 5, 1974, 5,000 gallons of nonflammable materials were received at the site. Pits, excavated onsite, were used as surface impoundments, where approximately 700,000 gallons of waste were dumped.

Remedial measures at the site will be implemented in two phases. Selected remedial actions approved at this time include: excavation and offsite disposal of buried materials (drums and/or trucks) at an approved RCRA facility; installation of shallow ground water interceptors downgradient from the waste sources; collection and treatment of contaminated ground water; recirculating the treated effluent to the ponds and shallow aquifer or discharging to Mill Creek. Total capital cost for the selected remedial alternative is estimated to be $7,095,000 with O&M costs approximately $753,000 per year. The decision on the remedial measures for the contaminated soils, (see separate sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DES DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Sand, Gravel and Stone, MD Contaminated Media: gw, soil, sw, sediments Key contaminants: toluene, methylene chloride acetone, chloroform, VOCs, xylene, ethylbenzene, arsenic, cadmium, chromium, phenols, heavy metals		

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Abstract - continued

the lower unconsolidated sand and bedrock aquifers, final site closure requirements and post closure operations and maintenance activities has been deferred until the Phase II RI/FS is completed.

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RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

Site: Maryland, Sand Gravel and Stone, Elkton Cecil County. Maryland.

Data Reviewed:

The following documents describing the analysis of cost-effectiveness and feasibility of remedial alternatives for the Sand, Gravel and Stone Site. I have been briefed by my staff on their contents, and they form the principal basis for my decision.

- Remedial Investigation and Feasibility Study (RI/FS) Report Sand, Gravel and Stone Site, Elkton, Cecil County, Maryland (July 1985).

- Remedial Action Master Plan and Remedial Investigation/Feasibility Study Work Plan, Sand, Gravel and Stone Site, Elkton, Cecil County, Maryland (December 1985).

- Staff summaries and recommendations

- Recommendations by the Maryland Department of Health and Mental Hygiene

Description of Selected Remedy:

The remedial measures will be conducted in two phases at this site.

The remedial measures approved at this time include excavation of buried materials (drums and/or trucks) and offsite disposal of hazardous materials at an approved RCRA facility. Installation of shallow ground water interceptors downgradient from the waste sources to collect the contaminated ground water and leachate for treatment at an onsite treatment plant before recirculating to the ponds and shallow aquifer or discharging to Mill Creek. The approved measures are based on the Phase I Remedial Investigation and Feasibility Study (RI/FS).

I have deferred a decision on the remedial measures for the contaminated soils, the lower unconsolidated sand and bedrock aquifers, final site closure requirements and post closure operations and maintenance activities until completion of the Phase II RI/FS.

Declarations

Consistent with the Comprehensive Environmental Response and Compensation and Liability Act of 1980 (CERCLA) (42 U.S.C §9601-9657) and the National Contingency Plan (40 CFR Part 300), and §101(24) of CERCLA, I have determined that the remedial action described above, together with proper operation and maintenance constitute a cost-effective remedy which mitigates and minimizes damage to public health, welfare, and the environment. The remedial action provides for the removal of hazardous

waste and minimizes the threat of further contamination of the environment. The Maryland Department of Health and Mental Hygiene has been consulted and agrees with the approved remedy. These activities will be considered part of the approved action and eligible for Trust Fund monies.

I have determined that the action being taken is appropriate when balanced against the availability of Trust Fund monies for use at other site.

9/30/85
Date

James M. Seif
Regional Administrator
EPA Region III

RECORD OF DECISION

REMEDIAL ALTERNATIVE SELECTION

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (PHASE I)

SAND, GRAVEL, AND STONE SITE

ELKTON, CECIL COUNTY, MARYLAND

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION III OFFICE
PHILADELPHIA, PENNSYLVANIA

SEPTEMBER 1985

1 0 SITE LOCATION AND DESCRIPTION

1.1 SITE LOCATION

The Sand, Gravel, and Stone Site is located in Elkton Cecil County, Maryland at 75°53'54" Longitude and 30°36'53" Latitude on the USGS North East, Maryland, 7.5-Minute quadrangle map. Consisting of about 200 acres, the site is located north of Maryland Route 40 and along a tributary to Mill Creek about 3 miles east of Elkton (Figure 1). It is situated within the western portion of a triangle formed by Marley Road to the northwest, Nottingham Road to the northeast, and Maryland Route 40 (Pulaski Highway) to the south (Figure 2).

1.2 SITE BACKGROUND AND DESCRIPTION

The site was previously operated as a sand and gravel quarry under the name Maryland Sand and Gravelstone Company. In December, 1979, President Lester Summers of the Sand, Gravel and Stone Company informed the Maryland Department of Natural Resources that the site was for sale, although no sale has since transpired.

It was reported that about 3 acres onsite were used for the disposal of waste processing water, sludge, still bottoms, and about 90 drums of solid and semisolid waste between 1969 and 1974. On July 16, 1974; 1,300 gallons of flamable products in drums were reportedly received and dumped. On August 5, 1974; 5,000 gallons of nonflammable materials were received at the site. Pits, excavated onsite, were used as surface impoundments, where approximately 700,000 gallons of waste were dumped.

On April 27, 1974 (1:00 P.M.), a fire occurred onsite during which a pool of chemical waste was burned at high intensity before it was extinguished. The cause of the fire was not determined.

Two hundred thousand gallons of liquid waste were removed from the site to Kin Buc Landfill in Edison, New Jersey in 1974. The drums and sludges that remained were buried onsite in excavated pits.

Numerous seeps were observed during a site reconnaissance by the RI/FS team. Several seeps are located south of Pond P01, one seep is in the wooded area east of Pond P02, and other seeps are located downgradient on a hillside west of Pond P03 in the Sedge Meadow. The Sedge Meadow is a hillside located downgradient between Pond P03 and the western tributary of Mill Creek. The seeps and surface water runoff from the western and southern sections of the site drain into the western tributary of Mill Creek.

A portion of the site located west of the Sedge Meadow has undergone excavation; however, the exact nature of the activities that occurred in this area is unknown. Further studies and assessment of this western portion are being planned.

Within a 1-mile radius of the site there are approximately 150 units housing about 570 residents. Elkton, a town of 6,468 residents is located approximately 3 miles to the east of the site. The town of North East, located approximately 1.8 miles west-southwest of the site, has a population of 1,469.

Surface waters from the site are collected by two intermittent streams: the western and eastern tributaries of Mill Creek. The tributaries merge at the southeastern corner of the site. Mill Creek flows south eastward from the site, turns eastward and then becomes a tributary of Elk Creek. Elk Creek drains into Elk River and consequently into the Chesapeake Bay. Recreational use of the surface waters for fishing occurs in both Elk Creek and Elk River.

1.3 EPA REMEDIAL ACTIVITES

In July 1979, EPA performed an initial site investigation . Prior to this date, the State handled the waste mananagement activities. In February 1982, EPA sent the field investigation team (FIT) to take more samples. The data was used in the Hazard Ranking System and a final score of 40.81 was obtained. In December 1982 the site was placed on the Proposed National Priority List. The Remedial Action Master Plan was prepared in March 1984 and the work plan for the RI/FS was prepared in May 1984. RI activities began in June 1984.

During the course of the investigation it was realized that the scope of the problem was larger than anticipated. The bedrock aquifer was encountered, a well installed and a sample taken from the well showed contamination. Also some background soil sampling locations were found to be contaminated. In addition, residential wells about a mile from the site were contaminated with organic chemicals, and one of the potentially responsible companies issued a report which suggested that the contaminants may be from the Sand, Gravel and Stone site.

The increase in the scope of the investigation led EPA to phase the investigation. Phase I activities are complete and the results are reported in the RI/FS issued. The remedial measures for this phase will address the burried materials, the shallow ground water aquifer and the surface water seeps. The Phase II RI/FS will begin in October 1985 and will further investigate soils and ground water in the western excavation area and the lower unconsolidated sand and bedrock aquifers.

2.0 GEOLOGY AND HYDROGEOLOGY

2.1 REGIONAL GEOLOGY

The site is located near the western edge of the Atlantic Coastal Plain, approximately two miles southeast of the Crystalline rock outcrops marking a break between the Piedmont and the Atlantic Coastal Plain physio-

graphic provinces. These provinces are separated by a somewhat vaguely defined transitional belt averaging about 5 miles in width, known as the "Fall Zone" or "Fall Line " which extends in a northeasterly direction across the State of Maryland. The bedrock deposits are extensively concealed by soil and alluvium in the coastal plain.

The bedrock geology of Maryland consists of a wedge of unconsolidated sediments, including gravel, sand, silt, and clay, which overlaps the rocks of the eastern piedmont along the irregular Fall Line. Eastward, this wedge of sediments thickens to more than 8,000 feet at the Atlantic coastline.

The sediments of the Coastal Plain dip eastward at a low angle, generally less than one degree, and range in age from Truassic to Quartenary. The younger formations crop out successively to the southeast across southern Maryland and the Eastern Shore. A thick layer of Quaternary gravel and sand covers the older formations throughout much of the region.

Mineral resources of the Coastal Plain are chiefly sand and gravel, which are used as aggregate materials by the construction industry. Clay for brick and other ceramic uses is also important. Small deposits of iron ore are of historical interest. Plentiful supplies of ground water are available from aquifers throughout much of the region.

Deep drilling in the area has revealed that metamorphic and igneous rocks, including schist, gneiss, and gabbro, underlie the sedimentary rocks of the Coastal Plain.

2.2 SITE GEOLOGY

The site is underlain by unconsolidated clay, sand, and gravel sediments believed to be derived from Piedmont or Pre-Cretaceous deposits. A Potomac geological group, consisting of Patapsco (upper member) and Patuxent (basal member) formations, has been identified.

The Patapsco formation consists of unconsolidated sand, sandy clay, clay, silt and small amounts of gravel. The clay in this formation is generally tan buff, white and characteristically pink, red, and mottled pink and white. The sand portion is mainly fine grained. Gravel in this layer is usually not in continuous beds but scattered through sandy clays.

The basal member of the Potomac group is the Patuxent formation which consists of discontinuous beds and lenses of sand, clay, silt, and gravel. Clay and sandy clay are the most abundant, sand is fairly abundant, and gravel is least abundant. The clays are light-colored white, yellow, pink, or red. The sand is mainly fine-grained, white, yellowish, or brownish in color, micaceous and somewhat arkosic. Coarse-grained sands are sometimes cemented with brown iron oxides.

The site is situated on an outcrop of the Patapsco formation. At the

site. the soils along with up to 30 feet of subsoil material, were removed during excavation associated with the quarry activities. Boring and monitoring well logs completed in this study reveal that the shallow clay layer begins approximately 17-34 feet below the surface and dips toward both the southeast and southwest. The layer may consist of discontinuous clay lenses.

The clay lenses dip southwest from Pond P03 toward the Sedge Meadow, south from Pond P01 toward Lower Haul Road, southwest from Pond P01, and then south toward the Swamp. A clay ridge line and a parallel valley to the east of this line occur in a northwest-southeast orientation; a fact that was confirmed by findings from the geophysical studies and ground water investigations. The location of boreholes and a geological studies and ground water investigations. The location of boreholes and a geologic profile of cross-section Z-Z' are shown in Figures 3 and 4. respectively.

A major unconsolidated deep and a bedrock aquifer are present onsite. Throughout most of the site. the shallow clay layers, at thicknesses of 24-56 feet, separate the unconsolidated deep aquifer from the shallow aquifer. No conclusive evidence is available to confirm whether the clay layer is continuous throughout the site. The potential for inter-aquifer communication cannot be ruled out. The proposed Phase II RI-FS program will address the deeper aquifers in a more comprehensive manner.

Bedrock at or near the site is present at depths above mean sea level of 32 feet to the north, -24 feet to the south, and -5 feet to the east. This represents a dipping of about 1-2 degrees to the southeast with a northeast strike. Black weathered bedrock material overlies the bedrock.

2.3 HYDROGEOLOGY

A shallow aquifer under ground water table conditions is present throughout the site. A shallow ground water divide and an underground channel exist in parallel and dissect the site in a northwest-southeast orientation. Three distinctive regimes of the shallow aquifer were delineated (Figure 5).

Regime #1 covers the area around Pond P01. The ground water flows underneath Pond P01 and fans southwestward toward the Swamp and southward toward Lower Haul Road.

Regime #2 covers the area around Pond P02. The ground water flows along an underground channel in a northwest-southeast orientation.

Regime #3 encompasses Pond P03. The ground water initially flows westward toward the Sedge Meadow and then southward toward the Swamp.

Consequently, three contaminated shallow ground water plumes coincide with the flow paths in the regimes. All three ground water aquifers outcrop in the form of surface seeps. Based on in-situ-hydrolic conductivities and field measured hydraulic gradients. it is estimated that the shallow ground water aquifer moves at a rate of approximately 10 feet per year. The estimated seepage flow ranges from 1.3 to 2,830 gallons per day.

The limited number of deep monitoring wells drilled onsite were insufficient to effectively map the ground water contours for the deep aquifer in the unconsolidated zone. Available information indicates that the flow is generally southward. Observations of the elevation of the bedrock in the area demonstrate that it dips southeastward with a northeastern-southwestern strike. Although only one bedrock well was installed for the study, data obtained from investigations of the nearby residential/institutional bedrock wells show that the bedrock aquifer generally flows southward.

2.4 SURFACE HYDROLOGY

Surface water from the site is collected by two intermittent streams, the western and eastern tributaries of Mill Creek, which merge at the southeastern corner of the site. Mill Creek flows southeastward from the site, turns eastward after crossing a railroad, and becomes a tributary of Elk Creek. Elk Creek drains into Elk River and consequently into the Chesapeake Bay.

The major onsite surface water features include:

- Standing water bodies: three major ponds (Ponds P01, P02, and P03) and several small low lying areas occasionally filled with water:
- Streams: the Mill Creek tributaries. numerous seeps or springs. and several unnamed intermittent streams;
- Major low lying areas: the Sedge Meadow area, a swampy area, and an Old Sedimentation Pond.

These onsite seeps, streams and other drainage pathways form three distinctive hydrologic units onsite:

- Unit 1 originates from an area near Pond P01.
- Unit 2 originates from an area near Pond P02.
- Unit 3 originates from an area encompassing the northwestern portion of the site, which contains Pond P03.

Generally. all onsite streams flow sluggishly in winding courses toward Mill Creek.

3.0 CURRENT SITE STATUS

An RI/FS was conducted by AEPCO. Inc. (a subcontractor to EPA through NUS for this site) during the period June 1984 to July 1985. A brief summary of the RI findings and appropriate remedial measures follows. including observations on public health and environmental concerns.

3 1 GEOPHYSICAL SURVEY

Geophysical surveys were conducted during the RI to aid in determining the limits of the magnetic anomalies and the possible occurrence of buried drums. An electromagnetic conductivity (EM) and resistivity survey coupled with magnetometer investigations were conducted. Major geophysical findings are summarized below:

- Six magnetic anomalies of relatively high magnitude and a seventh anomaly of lesser magnitude were identified within the quarried portion of the geophysical study area. The relatively high magnitude anomalies range from several hundred to approximately 1,600 gammas. The highest anomalies occurred near the spoil piles on the eastern edge of Pond P01. Two smaller magnitude anomalies occurred near Pond P02 in the eastern portion of the geophysical study area. The magnetic anomalies could possibly be attributed to buried ferromagnetic masses. The estimated total weight of buried ferromagnetic material at the site is 45,500 pounds. Assuming that a full 55-gallon drum weighs 44 pounds, 1 030 drums may be present.

- Three conductivity anomalies indicated potentially contaminated underground plumes within the quarried portion of the geophysical study area. Two anomalies occur near Pond P01 and are in proximity to magnetic anomalies.

- The third anomaly or conductivity zone occupies a larger area in the east-central portion approximately 400 feet north of Pond P01, but does not spatially correlate directly with a magnetic anomaly. Using a magnetic locator, it was found that a rectangular metallic object approximately 20 feet by 30 feet, is located approximately 100 feet south of the center of this conductivity anomaly area. In addition, several round metallic objects coincide with the center of this area.

- The presence of a ground water divide oriented northwest-southeast and bisecting the quarry portion of the geophysical study area is inferred from the terrain conductivity data and confirmed by the findings of the hydrogeological study.

- Based on the magnetometer study of the area magnetic anomalies, drums and possibly cement mixers might be buried in these areas. Containerized wastes are buried in areas approximately 150 feet northeast, 250 feet north, and 300 feet north of pond P01; and directly north and southwest of Pond P02. Assuming an average burial depth of 12 feet, the study findings suggest that the buried metallic objects combined are roughly equivalent in size to 1,030 steel drums.

3.2 WASTE INVESTIGATION

Wastes predominatly in solid and semi-solid forms were identified in Ponds P01, P02, and P03 and in the Sedge Meadow onsite.

Analytical findings for samples collected from 13 waste sampling stations showed that the wastes contain methylene chloride, acetone, chloroform 2-butanone, trichloroethene benzene, 2-chloroethylvinylether, toluene, chlorobenzene, diethyl phthalate, di-n-butylphthalate, and bis(2-ethylhexyl) phthalate.

3.3 SURFACE SOIL INVESTIGATION

Soils near Ponds P01, P02, and P03 and in the Sedge Meadow were found to be contaminated with elevated levels of methylene chloride and acetone; and trace amounts of chloroform, toluene, chlorobenzene, and 1,1,1-trichloroethane.

Twenty-three surface soil sampling stations were sampled during the RI. One of the stations detected elevated levels of methylene chloride, acetone, and chloroform in the located western excavated area of the site. A Phase II RI/FS has been proposed to obtain a more in-depth understanding of the status of the contamination in this area.

3.4 SURFACE WATER, SEDIMENT, AND BIOTA INVESTIGATION

Under this investigation, 34 surface water 29 sediment, and 2 biota sampling stations collected samples for analysis for chemical substances and other parameters.

Surface water quality findings include determinations of

1. Concentrations exceeding national drinking water standards for arsenic, cadmium chromium, lead, manganese, and/or mercury in Ponds P01, P02, and P03; in the Sedge Meadow; and in the Swamp. The high concentrations of manganese were attributed to the high natural background levels in the general area.

2. Elevated concentrations of the volatile organic compounds (VOC) methylene chloride trans-1,2-dichloroethene, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, toluene, chloroform, chlorobenzene, ethylbenzene, 2-hexanone, and xylenes in the Ponds P01, P02, and P03 and in the seeps below these ponds.

3. No detectable levels of VOC downstream from the ponds and seeps at the Sedge Meadow, Swamp, and Old Sedimentation Pond, suggesting that surface water contamination has not migrated offsite.

4. Elevated concentrations of semi-volatile organic compounds phthalate 2 4-dimethylphenol, 2-chlorophenol, aniline, phenol, 2-chlorophenol, and di-n-butylphthalate in the ponds and seeps.

5. No detectable levels of semi-volatile organic compounds at the Swamp, indicating that surface water contamination had not migrated beyond the site.

Sediment quality investigation findings revealed that:

1. Sediments in Ponds P01, P02, and P03 contained elevated concentrations of arsenic, cadmium, chromium, lead, and mercury.

2. Sediments in the Old Sedimentation Pond downstream from the ponds did not contain any metals above levels found at the background sampling station, except for chromium, copper, and lead at one station.

3. Elevated concentrations of VOC were noted in sediments in Ponds P01, P02 and P03, and in the Sedge Meadow. The VOC consisted of methylene chloride, tri-chloroethene, tetra-chloroethene, toluene, chlorobenzene, ethylbenzene, and xylenes.

4. Elevated levels of semi-volatile organic compounds were identified in sediment samples collected from Pond P01, the seep below Pond P01, Ponds P02 and P03, and the Sedge Meadow. The compounds included 1,4-dichlorobenzene, 2-methylphenol, benzoic acid, naphthalene, 2-methyl naphthalene, butylbenzyl phthalate, diethyl phthalate, di-n-butyl phthalate, and phenol.

Eight fish samples collected downstream from the site did not show any contamination (through biomagnefication or bioaccumulation) of metals, pesticides, or PCBs. This indicates that offsite aquatic biota have not been affected by the site contamination.

3.5 GROUND WATER QUALITY

The onsite shallow ground water aquifer was found to be contaminated with:

1. The HSL metals cadmium, chromium, and manganese at concentrations exceeding the national drinking water standards. Manganese contamination is not considered to be an environmental concern, however because of its normal high natural background levels in the study area.

2. Elevated levels of volatile organic compounds (VOC) were detected in the shallow monitoring wells installed near and downgradient from Ponds P01, P02, and P03 and immediately downgradient from the Swamp. Based on the results from all of the shallow monitoring wells, the VOCs measured at elevated levels were vinyl chloride, chloroethane, methylene chloride, acetone, 1,1-dichloroethane, trichloroethane, trans-1,2-dichlethene, 1,2-dichloroethane, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, benzene, 2-hexanone, toluene, chlorobenzene, ethylbenzene, and xylenes.

3. 2-Hexanone was detected in the shallow monitoring well at the far southeast corner of the site, but at concentrations that were much lower than those detected closer to the sources. Apparently, the quality of the shallow ground water improves through dilution and dispersion by the time it reaches the southern and southeastern boundries of the site.

4. The semi-volatile organic compounds phenol, aniline. 2-chlorophenol. 1,3-dichlorobenzene, 1.2-dichlorobenzene, 1,4-dichlorobenzene, 2-methyl phenol, 4-methyl phenol, 1,2,4-trichlorobenzene, 2-methyl naphthalene, pentachorophenol, and naphthalene were detected in an onsite monitoring well near the buried drum areas.

Monitoring wells downgradient from Pond P01 and south of the Swamp did not detect the presence of semi-volatile organic compounds, except for pentachlorophenol at a low concentration. This finding demonstrates that the water quality improves by the Lower Haul Road onsite.

Thirteen offsite residential wells were sampled for laboratory analysis of contaminants. Most of the residential wells contained concentrations of iron and manganese in excess of the applicable national drinking water standards. This result is attributed to the high natural background levels of these metals in the general area, rather than to any particular negative impacts from the onsite wastes. All of the other metals that were detected were measured at concentrations that were below the applicable national drinking water standards.

The only detection of a VOC in a residential well was a measurement of 7.14 ug/l of 1,1,1-trichloroethane in one residential well. A follow-up test confirmed the presence of 5.0 ug/l of the same compound in the residential well. This low level of 1,1,1-trichloroethane is not likely to result in any detectable acute or chronic health effects.

No detectable levels of semi-volatile organic compounds, pesticides or PCBs were observed in these residential wells.

4.0 PUBLIC HEALTH AND ENVIRONMENTAL CONCERNS

A list of site "contaminants of concern" was developed consisting of fourteen hazardous substances. These substances are benzene, 1,1,1-trichlorethane, 1,1-dichloroethene, trans-1,2dichloroethene, toluene, trichloroethene, vinyl chloride, chloroform, chlorobenzene, naphthalene, bis(2-ethylhexyl) phthalate, di-n-butyl phthalate chromium, and lead.

4.1 PUBLIC HEALTH CONCERNS

The major health concerns of the site contamination are:

1. The most critical health risk-related exposure path is through ingestion of contaminated shallow ground water onsite. Such exposure could result in chronic and carcinogenic health effects if contaminants were ingested over a prolonged period of time at the concentrations observed in onsite shallow ground water. Although the available data indicate that site receptors are not presently exposed to significant levels of contaminants in drinking water, they may be so exposed at some future time, particularly if the contaminants migrate via ground water to wells used for drinking purposes.

2. Airborne transport of contaminants to onsite or offsite receptors does not appear to be an exposure route of concern under the present conditions at the site, except for onsite remedial workers and trespassers at or near the sources in the drum/container burial areas and near Ponds P01, P02, and the Sedge Meadow.

3. Direct contact with onsite wastes, surface soils, sediments, and surface water seeps may be a threat to site trespassers. Although the site was fenced in 1984 during the EPA immediate removal action, the fence has been torn down and the site continues to be used by dirt bikers, hunters and children from the area.

4.2 ENVIRONMENTAL CONCERNS

The primary environmental concerns are related to the presence and movement of contamination in leachate, which eventually becomes an integral part of the surface water and sediment system in the regional watershed, and the potentially related effects on aquatic biota. All of the offsite biota (fish samples) showed nondetectable or background levels of metals, pesticides, and PCBs. Analytical results suggest that the aquatic communities have not been affected by the site contamination. There is a low potential for environmental impacts on aquatic biota in the nearby surface waters of Mill Creek, Little Elk Creek, and Elk River. The available chemical data indicate that offsite surface waters and sediments have not been affected by site contaminants. Further migration of contaminants via ground water to surface water could increase the potential for impacts on aquatic biota. Also site erosion could transport relatively immobile contaminants and could affect aquatic biota. Contaminants that pose a potential for bioaccumulation and entry into the food chain [e.g., lead, naphthalene, and bis(2-ethylhexyl) phthalate] are of concern.

5.0 ALTERNATIVES EVALUATION

5.1 OBJECTIVES

The major objective of remedial action at the Sand, Gravel and Stone Site is to eliminate or at least mitigate environmental contamination in order to protect public health and the environment. The contamination has been observed onsite in shallow ground water, in soils near waste sources, and in surface water and sediments immediately downgradient from the contaminant sources or plumes. The waste sources include Ponds P01, P02, and P03 and drum/container burial areas (Figure 6).

In order to meet the objective, remedial action should include minimizing further ground water contamination and the possibility of direct contact with the wastes. Leachate control may be an integral part of the remedial actions to eliminate the migration of contaminants across and off the site.

The initial formulation of potential alternative actions was based both on generic remedies and possible technologies. Initial screening was based on: 1) the reliability and effectiveness of a technology as a means of protecting the population and the environment potentially at risk from site contamination. 2) the engineering feasibility of the technology for

the Sand, Gravel and Stone site and 3) the cost involved in installing or implementing the technology. Initial technologies reviewed are presented in Table 1.

The response actions reviewed and the potential technologies retained following EPA's screening process and a detailed discussion of each of these alternatives are presented in the following section.

5.2 ALTERNATIVES

5.2.1 ALTERNATIVE A: NO ACTION ALTERNATIVE WITH MONITORING

Under a no-action alternative, additional remedial activities would not be performed. However, a long-term monitoring program would be established to provide information on contaminant movement and on exposure to public health, welfare, and the environment. Through the use of a comprehensive monitoring program, future environmental impacts could be observed and then addressed.

The three sources of water samples at the site are residential wells, monitoring wells, and surface water points. Monitoring of the residential wells would be essential since the water is used for human consumption. Previously sampled residential wells would be monitored to detect potential future contamination from offsite migration of contaminants.

Since potential for cross-aquifer communication and fractures in the bedrock can act as pathways for migration of contaminants, it would be necessary to monitor both shallow and deeper aquifers. Monitoring wells constructed during the RI phase of this study could be used for monitoring migrating contaminants downgradient from the site. A minimum of 10 onsite shallow, unconsolidated deep, and bedrock wells would be proposed for the monitoring program.

Surface waters and associated sediments are potential receptors for leachate that seeps from the deposited wastes. Also, shallow ground water may be contaminating some of the nearby surface waters. Erosion may transport contaminated sediments offsite and consequently contaminate offsite surface waters. To effectively detect these potential migration routes, a network of 8 surface water and sediment monitoring stations would be proposed.

Sampling and analyses should be conducted at least once per quarter owing to seasonal variations. For costing purposes, it is assumed that this program would be continued for 30 years. There are no capital costs for this alternative and the annual operation and maintenance (O&M) cost is $128.000.

5.2.2 ALTERNATIVES THAT MEET THE OBJECTIVES OF CERCLA

ALTERNATIVE B: CAPPING OF SELECTED AREAS. SURFACE RUNOFF AND SHALLOW GROUND WATER FLOW CONTROLS AND MONITORING

This alternative (Figure 7) meets the objectives of CERCLA. In addition to the monitoring program previously described, impermeable caps that meet

standards listed in the RCRA regulations (Part 264) would be be placed over selected areas of the site where threats to public health exist. Before installation the ponds would be dewatered. A surface runoff and shallow ground water flow control program also would be implemented. The cap system would reduce precipitation infiltration into the ground and thus the leaching of contaminants from the sources and consequently retard migration of contaminants from the site. Installation of the cap system should be done during dry weather to prevent the system. No leachate collection would be proposed for this alternative. Surface runoff would be diverted around the site to further reduce infiltration and ground water influx to the sources of contaminants. The shallow ground water flow control system would consist of an upgradient perimeter interceptor and diversion trench for the collection of offsite ground water influx to the site and the reduction of leachate production. The capital cost for this alternative is $7,819,000 and the annual O&M is $141,000.

5.2.3 ALTERNATIVES SATISFYING ALL APPLICABLE STANDARDS

5.2.3.1 ALTERNATIVE C-1: ONSITE LEACHATE AND SHALLOW GROUND WATER TREATMENT; SITE CLOSURE; AND ENVIRONMENTAL MONITORING

This alternative (Figure 8) satisfies all applicable standards. Under this alternative, a source reduction process, a site closure plan, and a long-term environmental monitoring program would be implemented. This source reduction process would involve installing four shallow ground water interceptor trenches downgradient from the waste sources; pumping of contaminated ground water; treating the ground water: recharging the shallow ground water aquifer by recirculating treated effluent to Ponds P01 P02 and P03 and the Swamp; and discharging treated effluent to Mill Creek. This process would continue until the organic compound and heavy metal levels in the shallow ground water aquifer reach background levels or an acceptable risk level (10^{-6}). or meet standards determined by the Agency.

This alternative is based on the assumption that there are four major pools or "reservoirs" of ground water (beneath and near Ponds P01, P02, and P03, and in the Swamp) containing elevated concentrations of heavy metals and volatile and semi-volatile organic compounds above the first shallow clay layer or lenses.

Because of the relatively low hydraulic conductivity of the sandy material above the shallow clay, the interceptor trench method rather then the recovery well method is proposed. The trenches would contain vertical side walls stabilized by sheet piling. The trenches would be excavated to a depth of approximately 12 to 15 feet just above the top of the first shallow clay layer or lenses. Excavation to depths penetrating the shallow clay should be avoided so that the integrity of the clay layer or lenses can be maintained.

For this remedial alternative a design study would be carried out initially to identify optimum design parameters for the proposed interceptor trench system. Excavated material from the trenches will be transported for offsite disposal at an approved landfill facility. The trenches

will be covered with concrete blocks to minimize safety and health hazards. All three ponds, the Swamp, and the proposed treatment facility would be fenced to reduce public safety and health hazards.

For this alternative, a treatability study would also be necessary to complete the design of the ground water treatment plant. A closure plan would be implemented at the end of the 30 year project life. The plan would consist of (1) a RCRA cap if necessary, (2) backfilling of the interceptor trenches, (3) decommissioning of the treatment plant, and (4) revegetation of disturbed areas. A long-term monitoring program would be also need to be implemented. The program would remain in force throughout the life of the project and beyond until 30 years after site closure. The capital cost of this alternative is $11,065,000 and the annual O&M cost is $823,000.

5.2.3.2 ALTERNATIVE C-2: ONSITE LEACHATE AND SHALLOW GROUND WATER TREATMENT; DRUM REMOVAL AND DISPOSAL; AND ENVIRONMENTAL MONITORING

Alternative C-2 closely resembles Alternative C-1, but with the following major exceptions:

- No site closure plan has been incorporated into Alternative C-2. (The need for such a plan will be readdressed during the Phase II RI/FS.)
- Excavated soil would remain onsite
- Drums would be removed and disposed at an offsite landfill meeting RCRA requirements; and
- The proposed ground water treatment system would remain in operation for 3 to 5 years instead of 30 years, as in Alternative C-1.

Also under this alternative, a source reduction process and a long-term environmental monitoring program would be implemented. Source reduction would involve (1) excavation and removal of drums and their disposal at an offsite landfill meeting RCRA requirements; and (2) installation of four shallow ground water interceptor trenches downgradient from the waste sources; collection and treatment of contaminated ground water; recharging the shallow ground water aquifer by recirculating treated effluent to Ponds P01, P02, and P03 and the Swamp; and discharging treated effluent to Mill Creek.

Instead of 30 years of ground water collection and treatment as proposed in Alternative C-1, under this alternative this process would continue for either 3 or 5 years (Options 1 and 2, respectively). The objectives of this alternative are to reduce the organic compound and heavy metal concentrations in the shallow ground water aquifer to background values or to an acceptable risk level (10^{-6}) or meet standards determined by the Agency. Materials excavated from interceptor trenches would be placed in existing ponds and/or be used to backfill pits resulting from drum excavation. The estimated amount of contaminated soil and waste to be excavated will be determined in the second phase remedial investigation.

According to the geophysical studies, it is estimated that the equivalent of 1,030 drums were burried onsite 12 to 15 feet below the existing grade. The basis for this conclusion is

- The topographic alterations resulting from past excavation activities indicate that these drums were buried at shallow depths.
- Terrain conductivity studies showed the presence of a shallow clay layer at a depth of 15 to 35 feet. This layer probably has not been punctured.
- Low terrain conductivity readings prevalent at depths below the clay layer suggest that the ground water aquifer immediately below the clay is not extensively contaminated. Thus the wastes might not have been buried below the clay layer.
- The drums have not corroded.

The proposed treatment system for this alternative is the same as the one for Alternative C-1, as shown in Figure 9. The rationale for the adoption of interceptor trenches instead of the recovery well method is the same as that stated in Alternative C-1. Also, the operation and maintenance work and the technical requirements for the trenches and ground water treatment system would be the same as those that were identified for Alternative C-1.

The capital cost of this alterative is $7,095,000 and the annual O&M cost is 753,000 for each option.

5.2.4 ALTERNATIVES EXCEEDING ALL APPLICABLE STANDARDS

5.2.4.1 ALTERNATIVE D-1: WASTE EXCAVATION, DISPOSAL OF WASTES IN AN APPROVED ONSITE LANDFILL, COLLECTION AND TREATMENT OF CONTAMINATED LEACHATE AND SHALLOW GROUND WATER, SITE CLOSURE, AND MONITORING

This alternative exceeds all applicable standards. As shown in Figure 10, it consists of the excavation of drummed/containerized wastes, as in C-2; additional excavation of sediments, and contaminated soils in or near ponds P01, P02 and P03; disposal of excavated wastes in an approved onsite landfill facility; co-treatment of pond water, water collected from excavation activities, and contaminated leachate and shallow ground water at an onsite treatment system; a site closure plan; and long-term environmental monitoring. The collection and treatment system for contaminated leachate and shallow ground water incorporated in this alternative is identical to the one planned for Alternative C-1. Material excavated from the leachate and shallow ground water interceptor trenches would be disposed in the proposed onsite landfill facility. The site closure plan for this alternative consists of the backfilling of the trenches, Ponds P01, P02, and the Swamp: decommissioning of the proposed treatment plant; and revegetation of disturbed areas. A long-term environmental monitoring program would be implemented.

Given the site's past use, it is evident that all three ponds had wastes dumped in them. Although, some of the wastes were removed and disposed offsite, it is likely that some residual wastes are still present in these ponds. The pond water would be first pumped and stored for co-treatment with the contaminated shallow ground water at an onsite treatment plant. Based on the results of the RI sampling program, the water and sediment in and the soils beneath and immediately around, each pond are still contaminated by the wastes. Concentration profiles of the surface water, sediment, soil, and shallow ground water samples indicate that contaminant concentrations decrease rapidly vertically within a depth of 5 feet and horizontally away from the waste sources in these ponds.

As discussed in the RI/FS report the onsite shallow clay acts, at least partially, as an impermeable layer against further penetration of contaminants to deeper soil or ground water zones.

An overiding factor in designing the waste excavation program, which affects the determination of a maximum safe excavation depth, is that the shallow clay layer, regardless of its effectiveness as a barrier, must not be punctured or compromised. This factor effectively limits the vertical extent of waste excavation to 15 feet, the shallowest depth at which the clay layer was found at the site during the RI. The most feasible ultimate depth of waste excavation is also dictated by concern for risk to public health and by costs. The RI data showed that grossly contaminated soils did not descend beyond 3 to 4 feet below the surface.

Based on excavation of 3 feet and assuming that the side slopes of the excavation pits are two units horizontal to one unit vertical (2:1 slopes), the total volume of the wastes (including drummed wastes, sediments, and contaminated soils) to be excavated would be about 51,300 cubic yards.

An onsite landfill location was proposed based on accessibility, relative remoteness from nearby residents, proximity to all waste sources, and the ease of post-closure maintenance and monitoring. The design of an onsite landfill would conform with all RCRA requirements (e.g., double liner/leachate collection with approved cap).

The proposed landfill would contain two liners for leachate collection and leak detection zones. A synthetic membrane placed on a 2-foot layer of clay would act as a double layer for the base and sides. A double-layer cap would consist of a PVC membrane and a 2-foot-thick clay layer beneath a seepage flow zone. Additional soil with a vegetative cover would be placed on top of the flow zone.

The capital cost of this alternative is $18,116,000 and the annual O&M cost is $884,000.

5.2.4.2 ALTERNATIVE D-2: WASTE EXCAVATION, ONSITE INCINERATION OF WASTES, COLLECTION AND TREATMENT OF CONTAMINATED LEACHATE AND SHALLOW GROUND WATER, SITE CLOSURE, AND MONITORING

This alternative exceeds all applicable standards. It consists of the excavation of drummed/containerized wastes, and the wastes, sediments, and contaminated soils in or near Ponds P01, P02, and P03; incineration of

excavated wastes in an approved onsite incinerator facility; co-treatment of pond water, water collected from excavation activities, and contaminated leachate and shallow ground water at an onsite treatment system; a site closure plan; and long-term environmental monitoring.

The waste excavation program and the collection and treatment system for contaminated leachate and shallow ground water in this alternative are identical to those for Alternative D-1 with the following exceptions. Excavated materials and wastes would be decontaminated in the proposed onsite incinerator facility, rather than being disposed of in a RCRA qualifying onsite landfill. Spent activated carbon and treatment sludge cakes would also be detoxified at the proposed incinerator facility. Incinerator ashes would be disposed at an approved offsite landfill facility.

The site closure plan for this alternative provides for the backfilling of the trenches, Ponds P01, P02, and P03 and the Swamp; the decommissioning of the proposed incinerator and treatment plants; and the revegetation of disturbed areas. A long-term environmental monitoring program will be implemented.

Only one type of incineration process is recommended for use at the site. This is the rotary kiln process, which is currently used at most commercial solid-waste destruction facilities. The rotary kiln is a proven method od treatment for troublesome and variable solid or semi-solid wastes.

Design and costing for onsite incineration are based upon estimates of contaminated soil volumes, as determined from the results of the RI. Some of the primary considerations used in the design and costing of this alternative are:

- The material to be treated/destroyed by rotary kiln incineration includes drummed/containerized wastes. low BTU contact soils and sediments and sludges and spent carbon from the proposed treatment system.

- A temporary waste storage facility would be a necessary component of this alternative. The incineration of the contaminated materials would be the limiting factor for the remediation of the site.

This alternative involves the excavation and incineration of drummed/containerized wastes and surface wastes totaling approximately 51,300 cubic yards. Since excavation and incineration rates would not be the same, a temporary storage faciltiy would be needed for excess excavated materials. A covered storage building would be used to protect the excavated materials from weathering. Decontaminated materials and the fly ash products would be considered hazardous, because of the presence of heavy metals -- unless testing proves otherwise -- and would be disposed in an approved offsite hazardous waste landfill.

Extensive testing would be required for a facility constructed onsite. A distinct advantage of this type of facility is that capacity limitations would not be as much of a drawback, since a facility could be built as large or in as many units as cost and feasibility permit.

An example of such a facility would include the construction of two incinerators, each with a capacity of five tons per hour.

The capital cost for this alternative is $20,145,000 and the annual O&M cost is $7,944,000.

5.2.5 ALTERNATIVES ADOPTING OFFSITE DISPOSAL

ALTERNATIVE E: WASTE EXCAVATION, DISPOSAL OF WASTES AT AN APPROVED OFFSITE LANDFILL. COLLECTION AND TREATMENT OF CONTAMINATED LEACHATE AND GROUND WATER, SITE CLOSURE AND MONITORING

This alternative is identical to Alternative D-1 except that the excavated waste is disposed at an offsite approved landfill. This would be done after the excavation process described in alternatives C-2 and D-1. Three offsite disposal facilities were identified as candidates:

- Fondessy facility Toledo Ohio, about 700 miles from the site.
- CECOS/CER facility, Williamsburg, Ohio, about 550 miles from the site.
- CECOS International facility, Buffalo New York, about 500 miles from the site.

Determination of the actual disposal facility depends on the offsite landfill capacity and on the negotiations. For cost estimating purposes, it is assumed that the one-way truck mileage would be about 600 miles. Material excavated from the leachate and ground water trenches and spent carbon and sludges generated from the wastewater treatment plant would also be disposed at an approved, offsite landfill.

In addition to the removal and disposal of contaminated material, contaminated ground water and leachate would be collected by interceptor trenches and treated by the proposed onsite treatment facility discussed for Alternative C-1. The treated effluent would be recirculated or discharged to Mill Creek. The site closure plan would include backfilling interceptor trenches, the three ponds and the Swamp; decommissioning of the proposed treatment plant; and revegetation of disturbed areas. A long-term environmental monitoring program would be implemented.

The capital cost of this alternative is $36,292,000 and the annual O&M cost is $798,000.

6.0 RECOMMENDED ALTERNATIVE

Section 300.68(j) of the National Contingency Plan (NCP) [47 FR 31180; July 16, 1982] states that the appropriate extent of remedy shall be determined by the lead agency's selection of the remedial alternative which the agency determines is cost-effective, (i.e., the lowest cost alternative that is technically feasible, and reliable) and which effectively

mitigates and minimzes damage to and provides adequate protection of public health, welfare, and the environment. In selecting a remedial alternative EPA considers all environmental laws that are applicable and relevant. Based on the evaluation of the cost-effectiveness of each of the proposed alternatives, the comments received from the public and information from the Maryland Department of Health and Mental Hygiene, Waste Management Administration, we recommend Alternative C-2 be implemented at the Sand, Gravel and Stone site, Elkton, Maryland.

Specifically, Alternative C-2 would involve excavation and removal of drums and their disposal at an offsite landfill meeting RCRA requirements; installation of shallow ground water interceptors downgradient from the waste sources; collection and treatment of contaminated ground water; recharging the shallow ground water aquifer by recirculating treated effluent to Ponds P01, P02 and P03 and the swamp; and discharging treated effluent to Mill Creek.

Secondary actions associated with the alternative include the following

- Improvement of the access road to accommodate heavy equipment and truck traffic.

- Formulation of an air monitoring plan and temporary evacuation plan for protection of local residents.

- Transportation and offsite disposal of all hazardous waste in accordance with RCRA and Department of Transportation regulations.

- Fencing around all three ponds, the swamp and the treatment facility to reduce public safety and health hazards.

Under this alternative the source remediation and ground water treatment processes would continue for 3 years (option 1). The objectives of this alternative are to reduce the organic compound and heavy metal concentrations in the shallow ground water aquifer to a design target based on the 10^{-6} cancer risk. The design target will be assessed and reevaluated if necessary, upon completion of the Phase II RI/FS study.

Remediation of the deeper aquifer and soils is being deferred at this time and will be addressed in the second phase. Additional data needs to be obtained to further define contamination found in the western excavation area, the deep unconsolidated aquifer and a deeper bedrock aquifer. The two lower aquifers may have potential to carry contaminated ground water offsite.

There are two major concerns which justify the removal of the buried materials and the installation of the shallow ground water interceptors for collection and treatment. First the environmental concern is movement of leachate which eventually becomes part of the surface water and sediment system. Secondly, a public health risk exists for the frequent trespassers who may come into contact with the surface seeps.

The surface seeps in the Sedge Meadow below Pond P01 and Pond P02 are of major concern. These seeps occur in areas where the shallow ground water flow intersects the surface and these seeps contribute to the surface waters of Mill Creek and the Swamp. In addition, access to the seeps is not inhibited in any way, and children could easily enter the seep areas. In fact, the emergency action of April 1984 attempted to restrict access to the site with a snow fence surrounding the perimeter but was unsuccessful because the dirt bike riders tore it down. Therefore, it is appropriate to implement these remedial activities this time, even though the RI will continue to investigate other areas of the site. The remedial action will mitigate the threat to public health, welfare and the environment associated with the shallow aquifer, the surface seeps and the buried drums at the site. The second phase RI/FS will address the deep sand and bedrock aquifers and the amount of the extent of contaminated soils above the shallow ground water aquifer.

6.1 OPERATION AND MAINTENANCE

The Operation and Maintenance will include routine maintenance and inspection of the treatment plant.

The source reduction and treatment process will be considered part of the approved remedy for a period of at least three years, unless contamination reduction targets are accomplished in less time. If the targets are not reached after three years of remedial activity, the Regional Administrator will determine if it is technically feasible to reach those targets. The long-term monitoring beyond the three-year period of ground water treatment and the post closure requirements are not included in this alternative and will be considered as part of Phase II remedy.

6.2 CONSISTENCY WITH ENVIRONMENTAL LAWS

Any drums removed for offsite disposal be tested, containerized, transported and disposed of in compliance with RCRA and State Waste Management laws.

The leachate collection and treatment system will be operated in accordance with all Clean Water Act NPDES requirements and Clean Air Act emission standards. The collection system will not be located in or affect any wetland or flood plain.

The selected remedy is an interim measure. It is anticipated that the Phase II RI/FS will obtain sufficient information to develop a plan to implement site closure and corrective action program which will address all applicable and relevant requirements of RCRA and other statutes.

7.0 EVALUATION OF ALTERNATIVES NOT SELECTED

Alternative A
No Action and Environmental Monitoring

This alternative would result in unacceptable exposure to contaminents onsite and will continue to allow uncontrolled releases of these contaminents offsite to the multi-media environment. The most critical health risk-

related exposure path is through ingestion of the contaminated shallow ground water onsite. Such exposure could result in chronic and carcinogenic health effects if the contaminants were ingested over a prolonged period of time at the concentrations observed in the shallow ground water onsite. Adverse impacts to the environment would continue under the no action alternative.

Alternative B

Capping of Selected Areas; Surface Runoff and Shallow Ground Water Flow Controls; and Environmental Monitoring

Since the exact depths and the physical state of the buried drums/containers are currently unknown these drums could be significantly corroded or buried at a depth different from the assumed 12 to 15 feet below the surface. Therefore even with a cap and upgradient diversion of surface water and the shallow aquifer this alternative could allow continued migration of contaminents to the shallow and/or deeper aquifers. This alternative does not address remediation of existing contamination in the aquifer. The risk for exposure to the contaminated ground water would continue.

Alternative C-1

Collection and Treatment of Contaminated Leachate and Shallow Ground Water: Site Closure; and Environmental Monitoring

Similar to Alternative B, this alternative does not address the buried drums/containers. Potential for contaminant migration from the drums would continue to exist. The interceptor trenches would collect contaminated ground water moving through the shallow aquifer but the possibility for vertical migration of contaminents from the shallow ground water aquifer to the deeper aquifers exists.

This remedial action also proposes a site closure option after 30 years of pumping and treating even though the ground water contamination will be reduced at an unknown rate. Therefore, the length of time to meet the design target levels cannot be determined.

Alternative D-1

Waste Excavation; Disposal of Wastes at an Approved Onsite Landfill; Collection and Treatment of Contaminated Leachate and Shallow Ground Water: Site Closure; and Environmental Monitoring. (see Alternative E)

Alternative D-2

Waste Excavation; Onsite Incineration of Wastes; Collection and Treatment of Contaminated Leachate and Shallow Ground Water; Clsoure; and Environmental Monitoring. (see Alternative E)

Alternative E

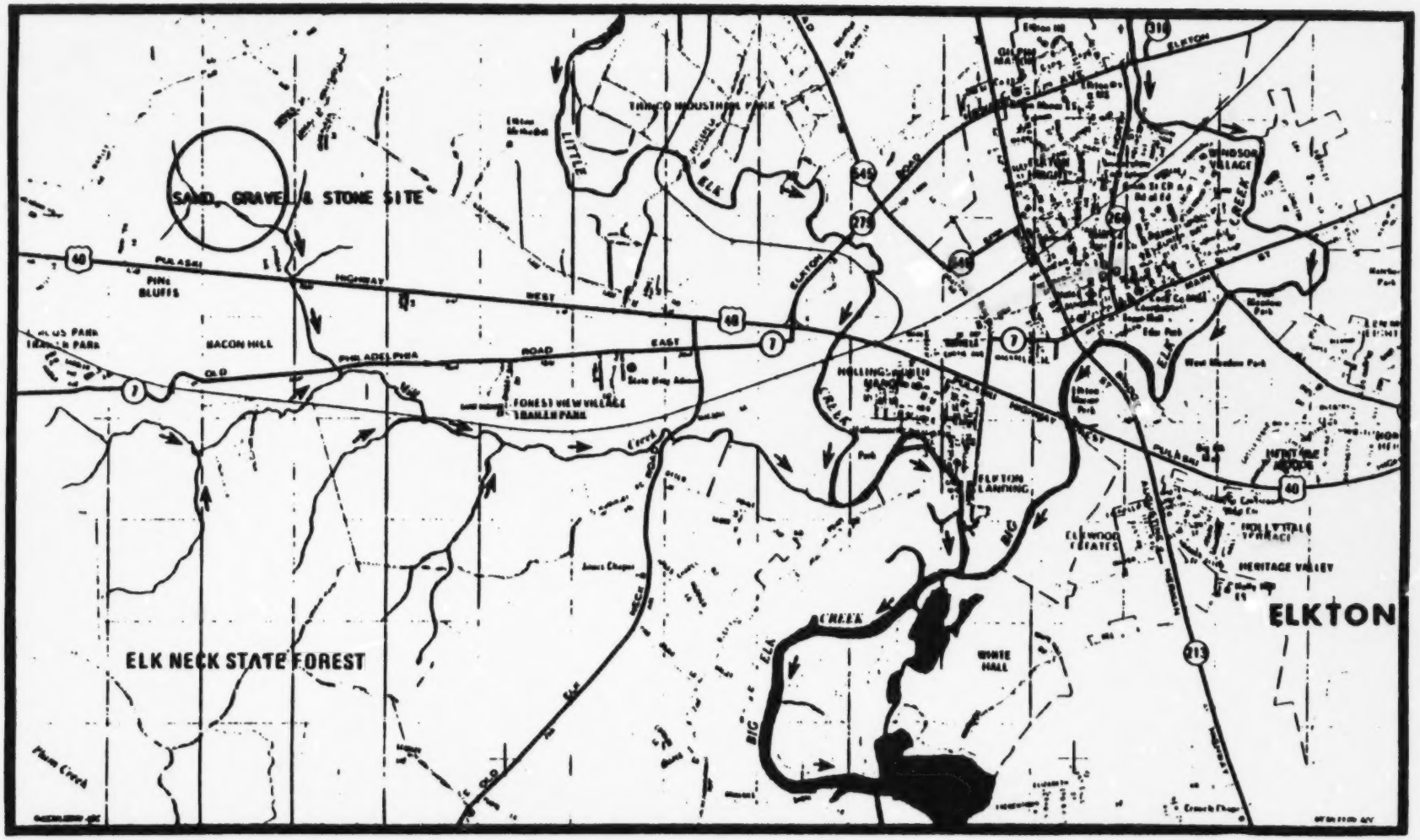
Waste Excavation; Disposal of Waste at an Approved Offsite Landfill; Collection and Treatment of Contaminated Leachate and Shallow Ground Water; Site Closure and Environmental Monitoring.

Basically, these three alternatives propose a scope of work which may be beyond what is necessary. The decision on excavation of contaminated soils and sediments is being deferred at this time. The collection and treatment of contaminated leachate and shallow ground water is identical to the recommended action. Although these alternatives are technically feasible and effective in protecting public health, welfare and the environment, further studies are necessary to evaluate these alternatives in a cost-effective manner.

TABLE 1

TECHNICAL SCREENING FOR TREATMENT TECHNOLOGIES SAND, GRAVEL, AND STONE SITE, ELKTON, MARYLAND

Unit Operations and Processes	Retained for Further Evaluation	Comments
Flow Equalization	Yes	Proven and effective
Precipitation, Flocculation & Sedimentation	Yes	Proven and effective
Filtration	Yes	Proven and effective
Biological Treatment Processes:		
o Activated Sludge	No	Susceptible to freezing in winter; ease of process upset due to wastewater toxicities; ineffective when organic carbon and nutrients are insufficient to support microbial growth; and system acclimation is difficult to achieve and maintain.
o Trickling Filter	No	(Same as above)
o Rotating Biological Contactors (RBCs)	No	(Same as above)
o Other Biological Treatment Processes	No	(Same as above)
Carbon Adsorption	Yes	Proven and effective
Air Stripping	No	Only removes volatile organic comtaminants
Steam Stripping	No	Only removes volatile organic compounds; and is energy intensive
Wet Air Oxidation	No	Level of performance unknown
Ozonation with or without Ultraviolet Irradiation	No	Level of performance unknown; does not remove metals.
Breakpoint Chlorination	No	Level of performance unknown; chlorinated byproducts may be hazardous.
Photolysis with or without Catalyst(s)	No	Not proven
Evaporation	No	Energy intensive
Ion Exchange or Resin Absorption	No	Susceptible to fouling; and only removes ionic compounds.
Electrodialysis	No	Susceptible to fouling: and only removes ionic compounds.
Freezing and Thawing	No	Energy intensive; and level of performance unknown.
Crystallization	No	Not proven
Polymerization	No	Not proven for heterogenic wastewaters
Sludge Thickening	Yes	Proven and effective
Sludge Dewatering	Yes	Proven and effective
Post-Aeration	Yes	Proven and effective



Source of Base Map: Cecil County Street Map, MD.

Scale: 0 2000 4000 ft

Reproduced from best available copy.

FIGURE 1. SITE LOCATION MAP

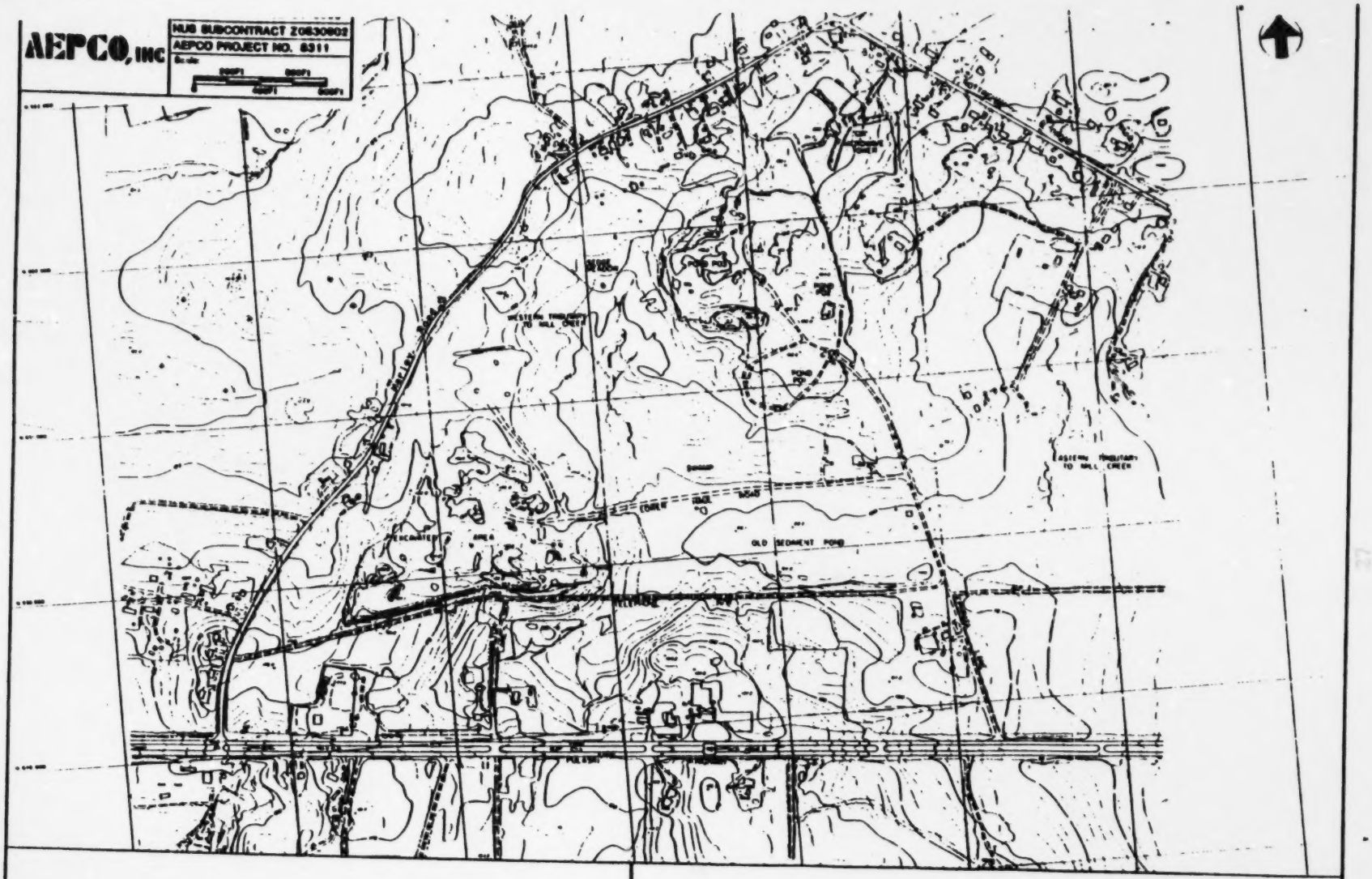


FIGURE 2. SITE MAP

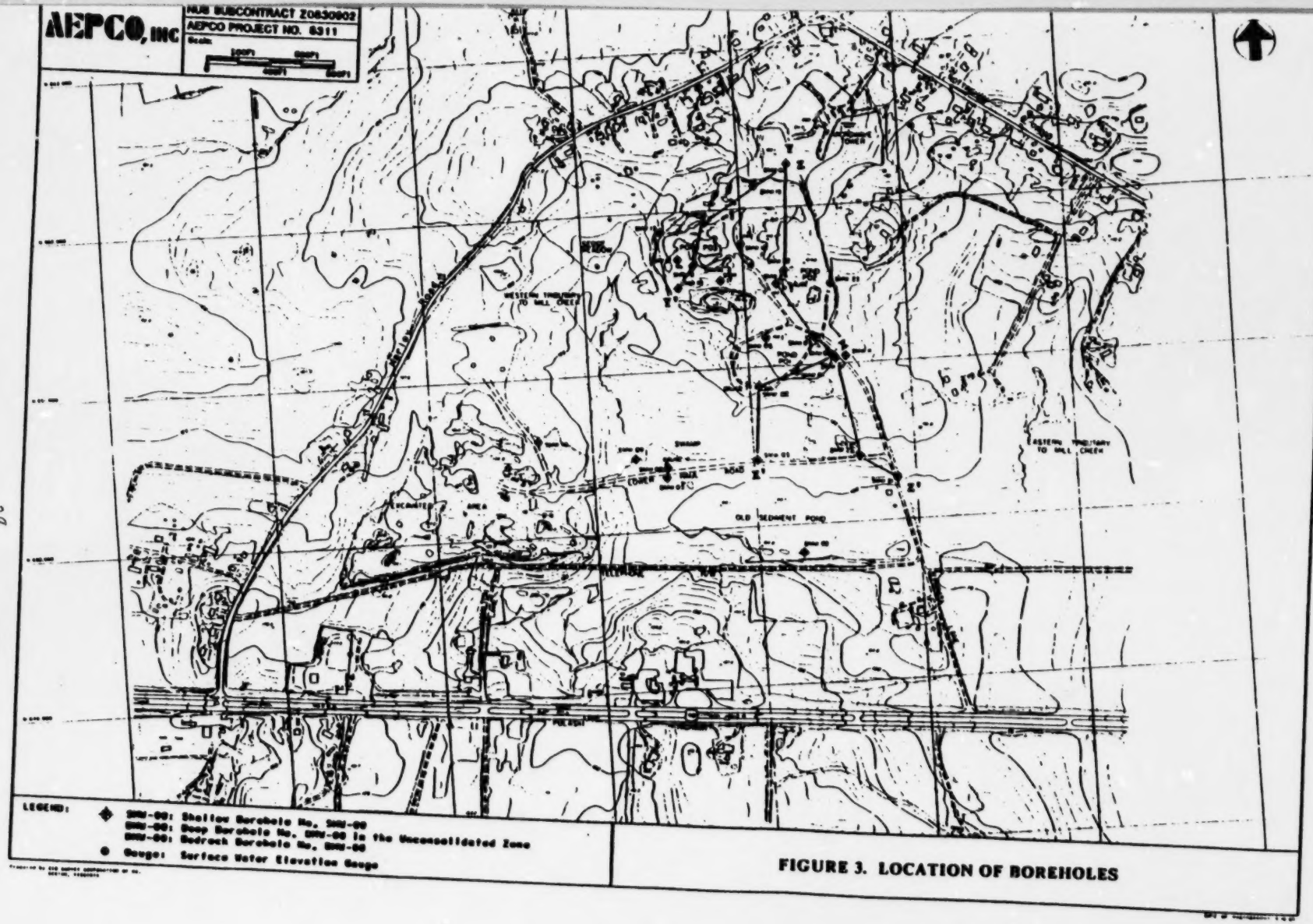


FIGURE 3. LOCATION OF BOREHOLES

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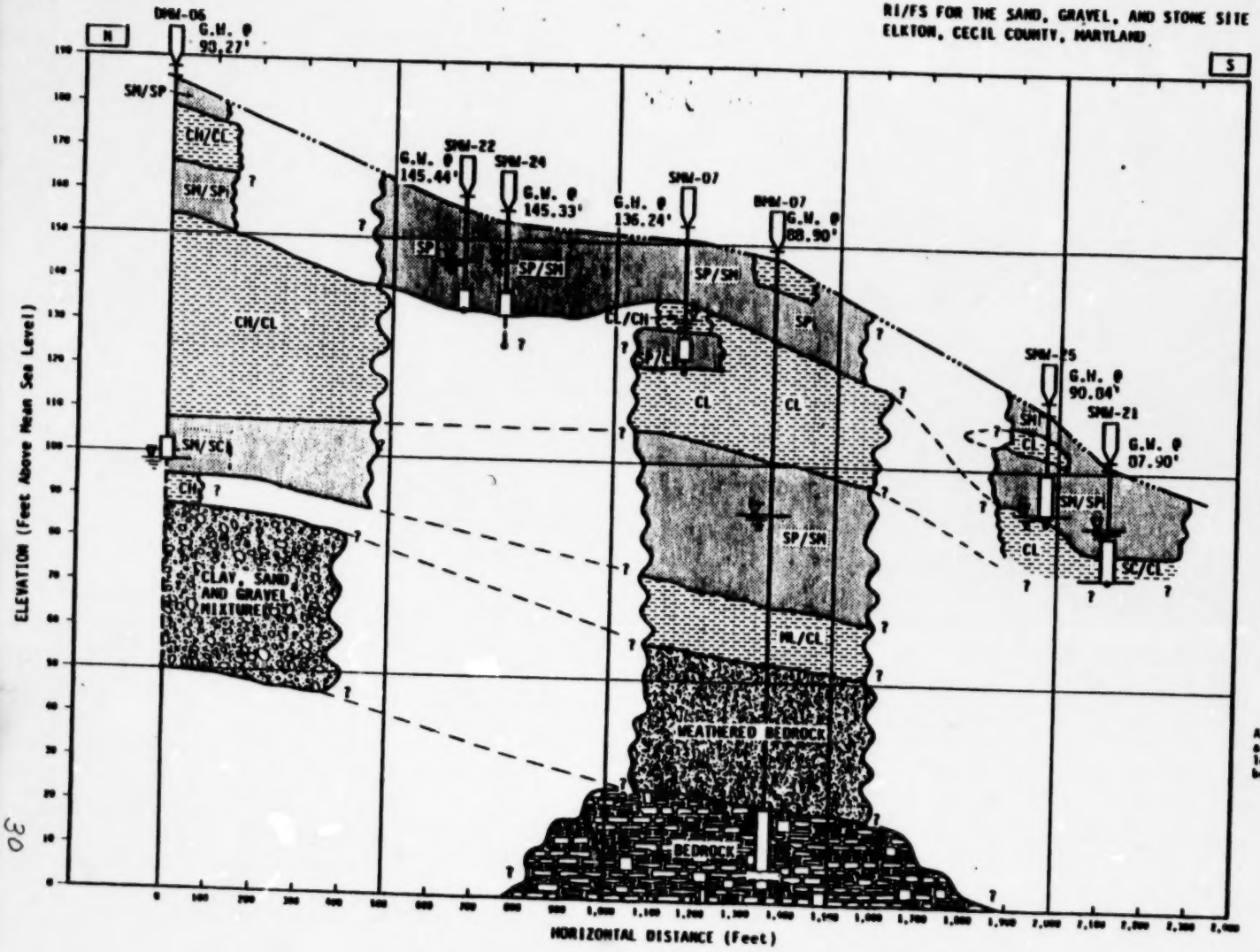

LEGEND:
- CH = Clays of High Plasticity
- CL = Gravelly, Sandy, and/or Silty Clays with Low to Medium Plasticity
- GC = Poorly Graded Clayey Gravels
- MH = Elastic Silts
- ML = Silty or Clayey Sands with Slight Plasticity
- SC = Clayey Sands
- SM = Silty Sands
- SP = Poorly Graded and/or Gravelly Sands

NOTES:
1. Groundwater elevations (feet abov MSL) were measured on March 21 1985
2. Refer to Figure 4-2-1 for locatio of this cross-section

All geologic boundaries were interpolated betw and are best approximations between borings. Actu logic boundaries and material types may be differe between borings than shown.

FIGURE 4. CROSS-SECTION Z-Z'

AEPCO, INC

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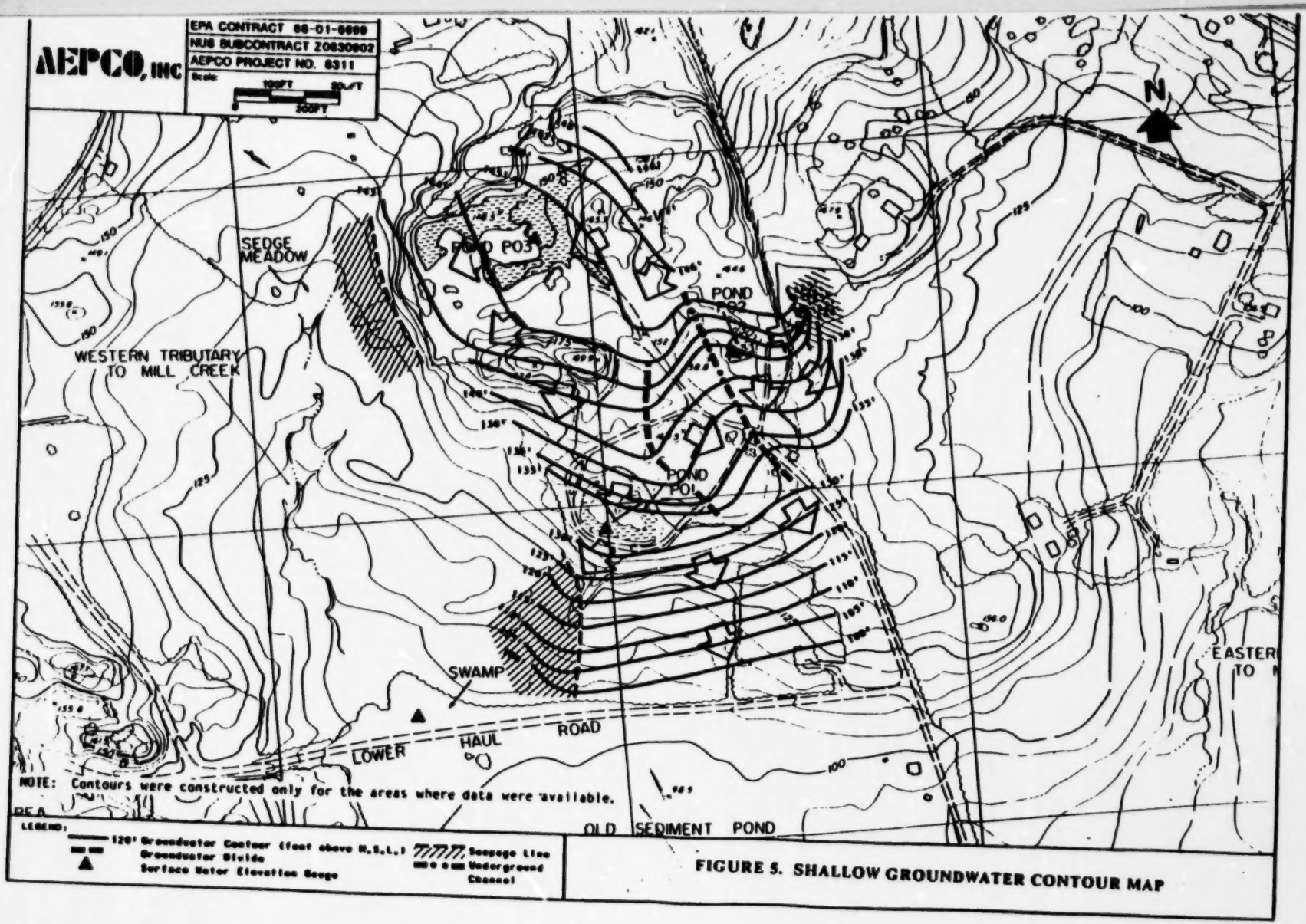

FIGURE 5. SHALLOW GROUNDWATER CONTOUR MAP

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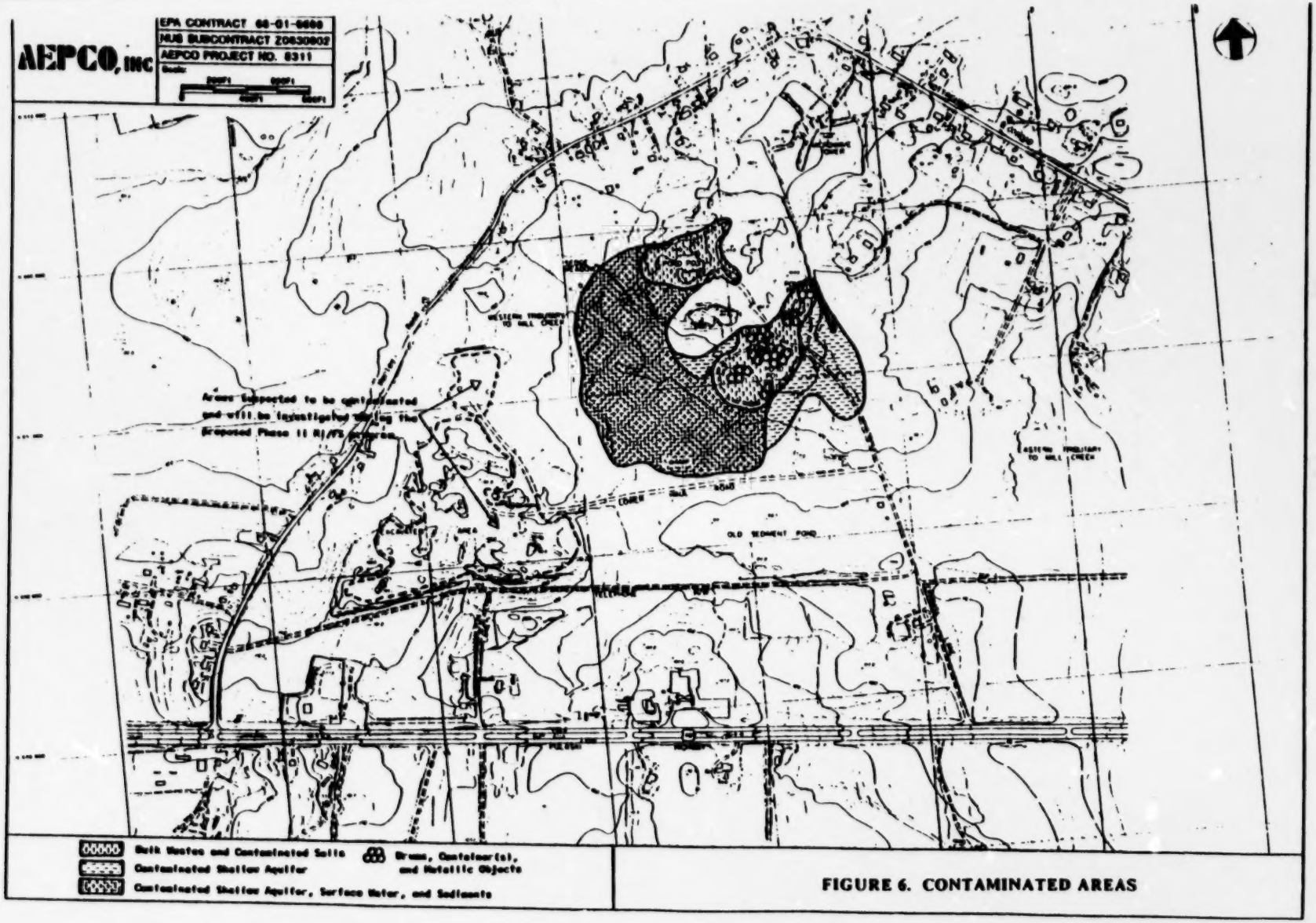
AEPCO, INC
EPA CONTRACT 68-01-6888
NUS SUBCONTRACT 20830902
AEPCO PROJECT NO. 6311
Areas Suspected to be Contaminated and will be Investigated During the Proposed Phase II RI/FS Program.
OLD SEDIMENT POND
Bulk Wastes and Contaminated Soils
Contaminated Shallow Aquifer
Contaminated Shallow Aquifer, Surface Water, and Sediments
Drums, Container(s), and Metallic Objects

FIGURE 6. CONTAMINATED AREAS

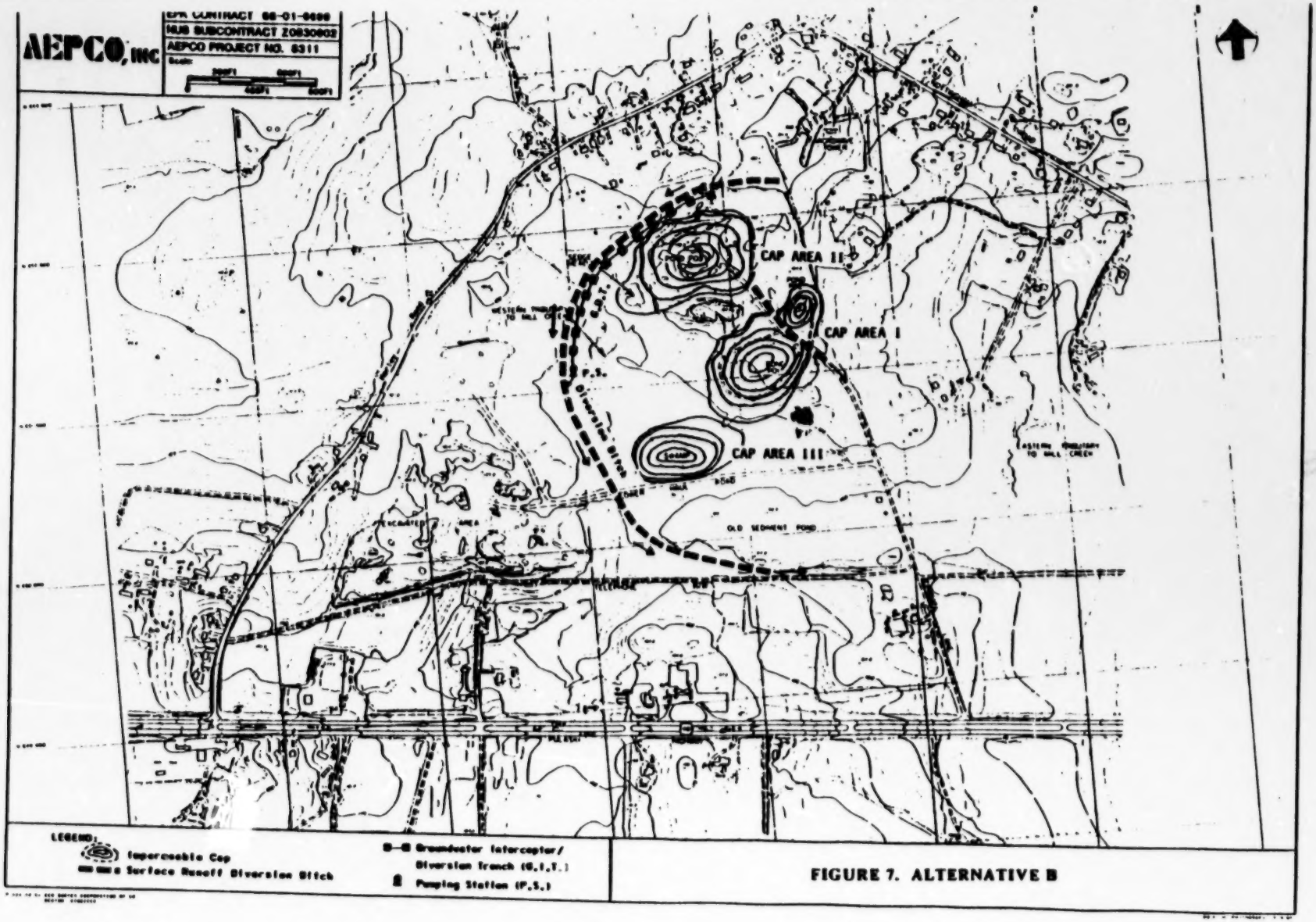

FIGURE 7. ALTERNATIVE B

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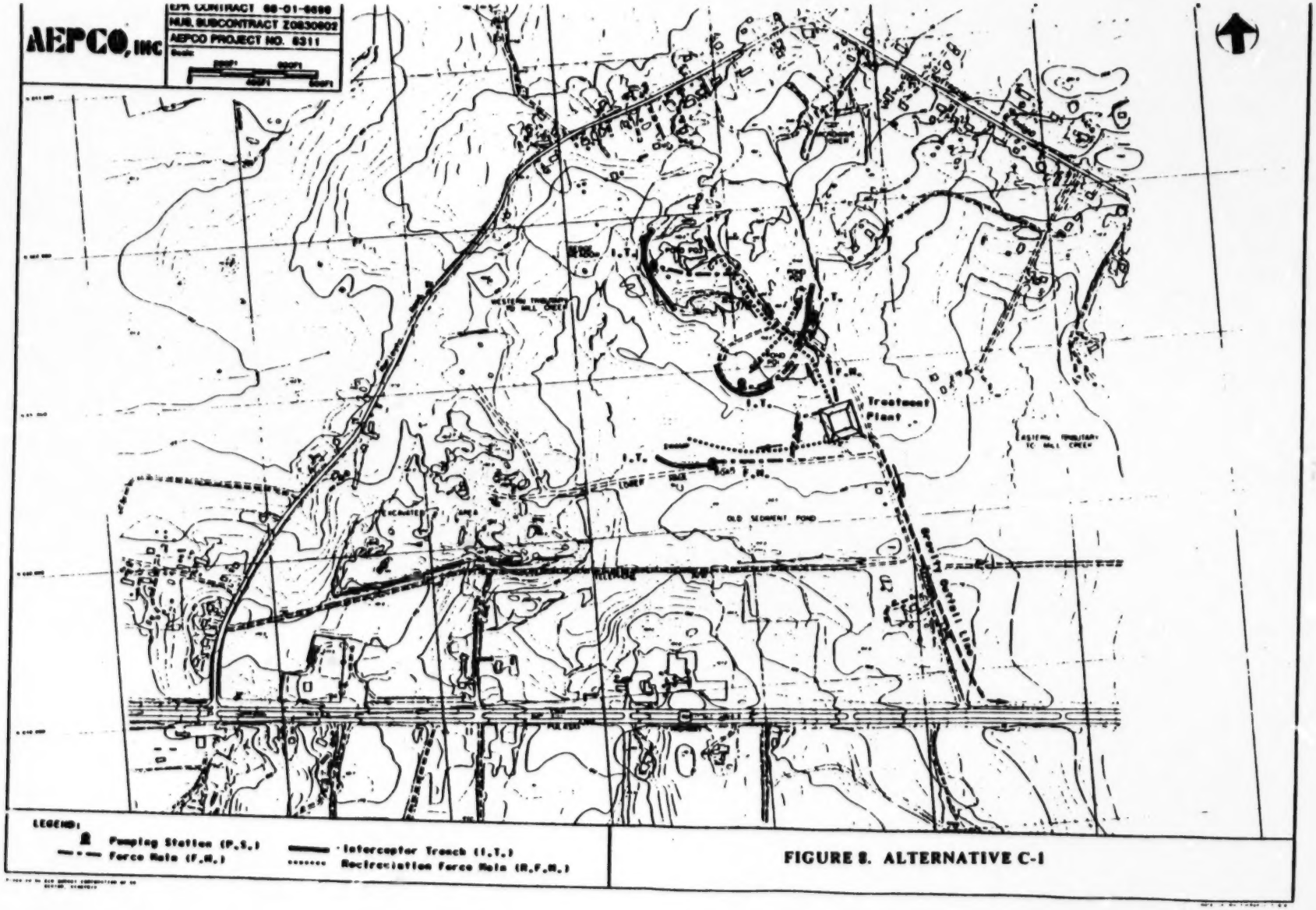


FIGURE 8. ALTERNATIVE C-1

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FOR THE SAND, GRAVEL & STONE SITE
ELKTON, CECIL COUNTY, MARYLAND

AEPCO, INC

EPA CONTRACT 68-01-6886
NUS SUBCONTRACT Z0830902
AEPCO PROJECT NO. 6311

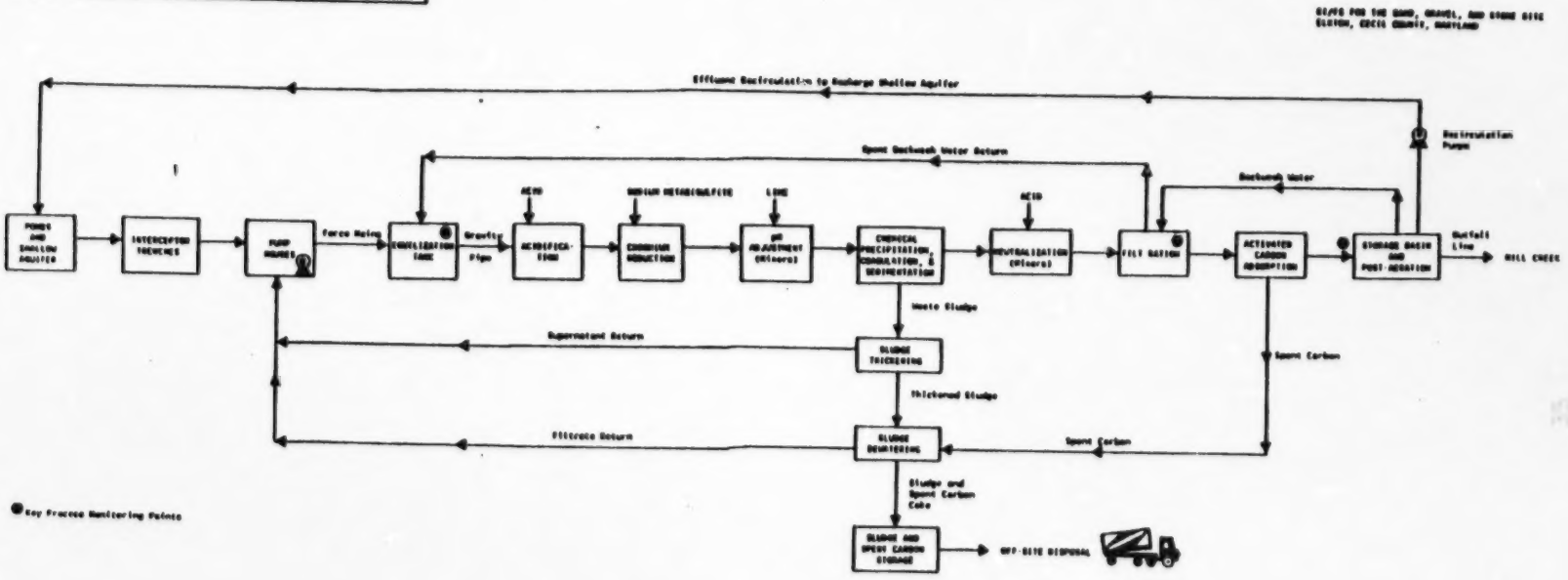
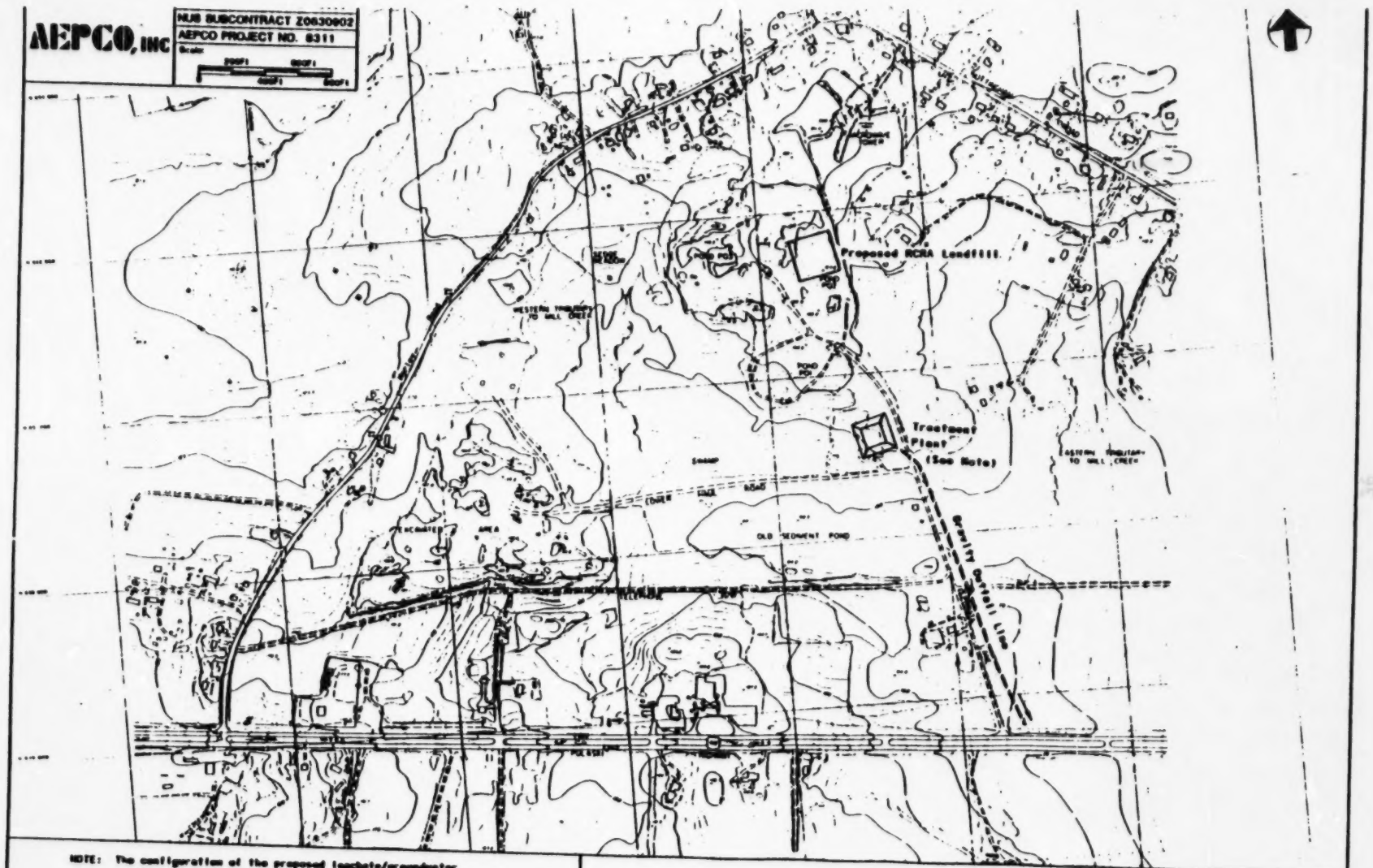


FIGURE 9. SCHEMATIC FLOW DIAGRAM OF THE PROPOSED TREATMENT PLANT

35



NOTE: The configuration of the proposed leachate/groundwater collection and treatment system is the same as that for Alternative C.

FIGURE 10. ALTERNATIVE D-1

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TABLE 1. SCOPE OF REMEDIATION

RI/FS FOR THE SAND, GRAVEL, AND STONE SITE
ELKTON, CECIL COUNTY, MARYLAND

DESCRIPTION OF ALTERNATIVE	SCOPE OF REMEDIAL ACTIONS					
	DRUMS	WASTE AND CONTAMINATED SOILS	LEACHATE & SHALLOW GROUNDWATER	DEEPER AQUIFERS AND WESTERN EXCAVATED AREA	LONG-TERM MONITORING	POST-CLOSURE
A. No-Action and Environmental Monitoring	No Action	No Action	No Action	Defered to Phase II	30 years	No Action
B. Capping of Selected Areas; Surface Runoff and Shallow Groundwater Flow Controls; and Environmental Monitoring	Capping	Capping	Flow Control	Defered to Phase II	30 years	Yes
C-1. Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Site Closure; and Environmental Monitoring	Flushing of Conaminants	Flushing of Conaminants	Collection & Treatment	Defered to Phase II	30+30 years	Yes
C-2. Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Removal and Disposal of Drums; and Environmental Monitoring	Excavation and Offsite Landfill	Flushing of Conaminants	Collection & Treatment	Defered to Phase II	3 years (Option 1) 5 years (Option 2)	Defered to Phase II
D-1. Waste Excavation; Disposal of Wastes at an Approved, Onsite Landfill; Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Site Closure; and Environmental Monitoring	Excavation and Onsite Landfill	Excavation and Onsite Landfill	Collection & Treatment	Defered to Phase II	30+30 years	Yes
D-2. Waste Excavation; Onsite Incineration of Wastes; Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Closure; and Environmental Monitoring	Excavation and Onsite Incineration	Excavation and Onsite Incineration	Collection & Treatment	Defered to Phase II	30+30 years	Yes
E. Waste Excavation, Disposal of Wastes at an Approved, Offsite Landfill; Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Site Closure; and Environmental Monitoring	Excavation and Offsite Landfill	Excavation and Offsite Landfill	Collection & Treatment	Defered to Phase II	30+30 years	Yes

TABLE 2. COST-EFFECTIVENESS COMPARISON OF ALTERNATIVES

RI/FS FOR THE SAND, GRAVEL, AND STONE SITE
ELKTON, CECIL COUNTY, MARYLAND

ALTERNATIVE	PRESENT WORTH			PUBLIC HEALTH CONCERNS	ENVIRONMENTAL CONCERNS	TECHNICAL CONCERNS	INSTITUTIONAL CONCERNS
	BASE	HIGH	LOW				
I. SOURCE CONTROLS:							
A. No-Action and Environmental Monitoring	$1,207,000	$1,327,000	$1,086,000	Unacceptable exposure to contaminants on site and eventual uncontrolled releases of these contaminants off site to the multimedia environment; could potentially cause a 1.0E-6 cancer risk via ingestion of contaminated water.	Continued migration to the shallow and/or deeper aquifers and uncontrolled releases of contaminants to other environmental media.	....	Unacceptable
B. Capping of Selected Areas; Surface Runoff and Shallow Groundwater Flow Controls; and Environmental Monitoring	$9,501,000	$10,462,000	$8,569,000	Exposure through groundwater media will continue. Surface leachate seeps will be stopped.	Continued migration to the shallow and/or deeper aquifers.	....	Unacceptable
C-1. Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Site Closure; and Environmental Monitoring	$18,766,000	$26,089,000	$15,566,000	Groundwater contamination will be reduced at an unknown rate. Length of time of unacceptable exposure cannot be determined.	Migration to groundwater and release of contaminants to surface leachates will be reduced at an unknown rate.	....	.....
C-2. Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Removal and Disposal of Drums; and Environmental Monitoring	$8,854,000 (Option 1)* $9,143,000 (Option 2)*	$10,672,000 (Option 1) $11,041,000 (Option 2)	$7,453,000 (Option 1) $7,687,000 (Option 2)	Groundwater contamination will be reduced at an unknown rate. Duration of unacceptable exposure cannot be determined. Also, additional exposure to wastes via truck travel during disposal at an offsite disposal site. This alternative will be amended to further address source contamination when the Phase II RI/FS is completed.	Same as Public Health Concerns.	....	.....
D-1. Waste Excavation; Disposal of Wastes at an Approved, Onsite Landfill; Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Site Closure; and Environmental Monitoring	$26,139,000	$32,911,000	$21,529,000	Same as Alternative C-1. Also, excavation of wastes will result in a short-term increase in air emissions during the remedial action period. Removal of wastes will reduce long-term health concerns and accelerate groundwater cleanup.	Same as Public Health Concerns.	Absolute quantity of wastes cannot be accurately quantified.	.....
D-2. Waste Excavation; Onsite Incineration of Wastes; Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Closure; and Environmental Monitoring	$46,717,000	$58,516,000	$37,089,000	Same as Alternative D-1.	Same as Alternative D-1.	Same as Alternative D-1.	.....
E. Waste Excavation, Disposal of Wastes at an Approved, Offsite Landfill; Collection and Treatment of Contaminated Leachate and Shallow Groundwater; Site Closure; and Environmental Monitoring	$43,787,000	$53,749,000	$35,992,000	Same as Alternative D-1. Also, additional exposure to wastes via truck travel during disposal at an offsite landfill.	Same as Public Health Concerns	Same as Alternative D-1. In addition, securing an approved, offsite facility capable of accepting the wastes may be difficult.	Same as Technical Concerns.
II. MANAGEMENT OF MIGRATION							
No Action & Environmental Monitoring	$1,207,000	$1,327,000	$1,086,000	Same as Alternative A.	Same as Alternative A.	....	Unacceptable

* Options 1 and 2 require operation of the proposed groundwater treatment system for 3 and 5 years, respectively.

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MEETING SUMMARY
SAND, GRAVEL AND STONE SITE
ELKTON, CECIL COUNTY, MARYLAND
SEPTEMBER 5, 1985

A public meeting was held at 7:00 p.m. on September 5, 1985, at Elkton High School, in Elkton, Maryland. The purpose of the meeting was to discuss with interested parties the results of the remedial investigation (RI) and the feasibility study (FS) conducted by the EPA at the Sand, Gravel and Stone Site and to request comments from the public concerning the FS and the EPA's preferred alternative.

There were approximately 30 individuals in the audience including representatives from the local radio station and newspaper, the Cecil County Sheriff's Department, various state agencies, contractors who have been involved in site work, the EPA, some potentially responsible parties (PRP), and interested citizens.

Boyd Grove of the Maryland Department of Health and Mental Hygiene opened the meeting by introducing himself and explaining the purpose of the meeting. He stated that any verbal or written questions after the meeting could be communicated to him at his office in Baltimore. Mr. Grove then introduced Ann Cardinal, who is Community Relations Coordinator for the EPA Region III office in Philadelphia, Pennsylvania.

Ms. Cardinal explained the concept of the RI and FS and briefly reviewed the fact sheets that were made available to everyone at the meeting. She then explained that after the public meeting, interested parties had until September 20 to comment on the FS before the EPA issued its Record of Decision (ROD), which states the preferred alternative for cleanup of the Sand, Gravel and Stone Site. She went on to explain that after the ROD is issued, the EPA begins a remedial design phase, which studies the methods of implementing the preferred alternative.

Ms. Cardinal then turned the meeting over to Roy Schrock, who is the Region III EPA project manager for the site. Mr. Schrock explained the roles played by the various contractors and agencies working with the EPA on this project, including NUS, AEPCO, and the Maryland Department of Health and Mental Hygiene.

Mr. Schrock's presentation was divided into two parts corresponding to the RI and the FS reports. First he explained the history of the EPA's investigation, the RI, and the current extent of the EPA's knowledge about the site. This included a description of the contaminants found in the surface waters, the soils, and the shallow groundwater aquifer on site. He emphasized the point that the RI thus far had not investigated the deeper aquifers for contamination, and that this investigation, referred to as the Phase II RI, would need to be conducted at a later time.

He then explained that contamination was found in only one offsite well and that the contaminant, which is not considered by the EPA to be a serious health threat, was found at barely detectable levels (5 to 7 parts per billion). Though the

situation does not constitute a health threat, it does indicate that the contamination has moved off site.

Prior to beginning the second part of his presentation concerning the remedial alternatives, Mr. Schrock entertained questions from the audience. These questions were generally requests for clarifications or additional explanations of further proposed studies (Phase II) and the nature, quantities, and movement of contaminants on the site. A summary of issues and responses is included at the end of this report.

During the second part of Mr. Schrock's presentation, he briefly described each of the 7 alternative remedial actions. He then introduced the preferred alternative, along with a more detailed explanation and requested comments and questions from the audience.

The comments and questions generally pertained to what had been said at the meeting since no one in the audience had time to review the fact sheets prior to that evening. Most of the questions were requests for further information or clarification of topics discussed previously during the meeting.

Attached is a summary of issues and questions that were raised during the meeting and the responses given by the EPA.

A SUMMARY OF
CITIZEN AND INTERESTED-PARTY COMMENTS
AND CONCERNS AND U.S. ENVIRONMENTAL
PROTECTION AGENCY RESPONSES

SAND, GRAVEL AND STONE SITE
PUBLIC MEETING

ELKTON, CECIL COUNTY, MARYLAND
SEPTEMBER 5, 1985

Issue: **Interested parties were curious as to when the Phase II RI would be completed and how the results would affect the results of the Phase I FS.**

Response: Phase II will begin in October and will require 3 to 6 months for data collection. After the data are analyzed, another feasibility study will be prepared to deal with the entire site rather than just that part of the site studied under the Phase I RI. The results of the current FS should not be affected by further findings from the Phase II RI, except in terms of cost increases resulting from the potential need to treat greater quantities of groundwater and dispose of more materials and soil at offsite locations.

Issue: **A number of questions pertained to the nature and movement of the contaminants found on site. Explanations were requested for some of the more technical terms used during the presentation. One individual wanted to know if there were any PCBs or radioactive materials found on site. Individuals were also concerned about what was in the buried drums.**

Response: A description of the difference between volatile and semivolatile chemicals was given. While many of the chemicals found on the site have been identified, the contents of the buried drums and containers have not been sampled. It is assumed that they contain many of the chemicals identified on the site thus far, and possibly additional ones. No radioactive materials or PCBs have been found on the site.

Groundwater is moving at a rate of about 10 feet/year, which means it will be a long time before health threatening contamination reaches any offsite wells. Despite the fact that nonhealth-threatening contamination was found in one offsite well, the chances of a "slug" of contamination reaching an offsite well are slight. Monitoring wells would be able to detect any movement of this nature to offsite locations.

Issue: **A number of individuals requested clarification or further information on the alternatives resulting from the FS. Questions pertained specifically to the nature of the groundwater treatment system, schedule for cleanup, and amount of time required to flush contaminants from the soil.**

Response: If the preferred alternative is chosen, it will be 9 months to a year before work begins. The buried drums would be disposed at an approved, offsite facility. The groundwater treatment system would consist of a number of chemical process steps designed to remove chemical contaminants at various stages of the process, as determined by individual contaminant characteristics. Redundancy is built into the system so that if one part of the system fails, that function can be performed by a backup unit. (A technical explanation of each part of the process was provided in response to the question.)

It was estimated that 30 to 70 years would be required to flush contaminants from the soil.

Issue: **Interested parties were concerned about the size and use of an onsite landfill and use of the land after closure of the landfill.**

Response: If an alternative requiring a landfill were chosen, the landfill would be designed according to the needs of the site and would be approximately 150 feet by 150 feet. If the EPA constructed the landfill with Superfund money, it would be used only for disposal of onsite wastes. However, if a private consortium built it without the use of Superfund money, and the EPA approved it, the landfill could potentially be used for commercial disposal of offsite wastes.

Issue: **Citizens were interested in knowing what could be done with the land after the cleanup had been completed.**

Response: No final cleanup for the site has yet been proposed. The land is privately owned, and neither the EPA nor the state would assume ownership as a result of cleanup. If a landfill is constructed on the site, deed restrictions would be enacted to control future land use and the integrity of the landfill. If onsite soil treatment is required (as opposed to offsite disposal), necessary personnel would be granted access rights for the required amount of time. At the completion of the cleanup, the land would still belong to the owner.

Issue: **One individual wanted to know if choosing a lesser remedial alternative or concentrating on removal of one group of chemicals would result in reducing the threat of contamination to an acceptable level.**

Response: Standards for site cleanup have not yet been put on paper, although the EPA would like to meet drinking water standards or reduce contaminants so that they are below the 10^{-6} cancer risk level. The EPA does not believe it is feasible to treat one set of chemicals and leave another in the ground just to be able to meet a standard risk level.

RESPONSE TO WRITTEN COMMENTS

Commentator 1 - Air Products and Chemicals, Inc.
Comments submitted on August 5, 1985, September 5, 1985 and September 24. 1985

COMMENT:

This commentator's basic position is that the RI/FS is incomplete and does not provide a rational basis for selecting any remedial alternatives at this time. In support of this position this commentator argued that: (1) there are no current or potential environmental risks at the site; (2) the estimated cost of the C-2 program is excessive primarily because of the incomplete information now available and; (3) several alternatives have been discarded out of hand. Additionally, this commentator believes the EPA erred procedurely by not providing a sufficient comment period and proceeding with the selection of a remedy prior to the completion of the Phase II RI/FS.

RESPONSE:

The EPA believes there is sufficient information available to proceed with selecting a remedial alternative at this site. The completed Phase I RI/FS clearly shows that hazardous substances were disposed of at the site and that there has been uncontrolled releases of these substances from the disposal areas into the environment The releases have contaminated surface waters. ground water, soils and sediments. The concentrations of hazardous substances in the shallow ground water and surface waters near the disposal areas are substantially above guidelines and, in some instances, regulated limits. A toxicologic risk assessment in the RI report found that onsite wastes, surface soils sediments and surface waters were contaminated to such an extent that they pose a potential direct contact threat to site trespassers, which are known to frequent the site.

The hydrogeologic and surface water assessments show that the hazardous substances are in ground water and surface water bodies which are an integral part of the surface water and sediment system of the regional watershed. It is clear from the data that the substances are migrating and will continue to migrate through the environment. The further migration of these substances could negatively affect the environment of the watershed. The current impacts are restricted to Sand, Gravel and Stone property, however, EPA does not have to, nor does it believe it should, wait until the substances have migrated off the property and cause negative off-property impacts before it acts to control the contamination.

At this site, the control of surface seeps and shallow ground water is a measure which will minimize the further releases and migration of hazardous substances before the potential for negative off-property effects becomes a reality. The control of the surface seeps will also minimize the direct contact threats the seeps pose to site trespassers. The removal of buried drums and other containerized wastes is a reliable, proven and effective source control measure which will further contribute to minimizing the uncontrolled release of hazardous substances from the site.

In reaching a decision on the appropriate CERCLA response action the EPA will look to other environmental laws and regulations for guidance and will attempt to comply with these statutes. In this instance, it is clear that there is sufficient information to assess RCRA Part 264 regulations. These regulations call for a corrective action program when hazardous substances have migrated beyond the waste management area boundries and closure actions in the waste disposal areas. Although, at this time CERCLA response actions do not have to comply with other environmental laws and regulations, it is clear that to meet the directives in EPA's RI/FS guidance manual regarding assessment of all applicable and relevant standards, there is adequate information to decide that the drum removal and water collection and treatment program are appropriate components of a corrective action and closure program for this site.

The estimated costs of the C-2 program is based on a reasonable initial design of the alternative. Existing data clearly shows that the system will have to be designed to collect and treat the shallow ground water flows. In order to not exclude the cost effective implementation of any additonal water treatment which may be necessary as a result of the Phase II RI/FS, EPA will look closely at systems which have the ability to efficeintly and effectively increase capacity. In regard to the drum removal, EPA will excavate and test buried drums and other containers to determine the need for and type of offsite disposal before offsite disposal occurs. However, until a final design is completed it is premature to state that the system has been over designed.

In selecting the C-2 option the Agency has not rejected any option "out of hand". The feasibility study clearly considered an extensive list of remedial options. During design EPA will continue to assess all collection systems and treatment designs which meet the objectives of the C-2 option as part of the standard value engineering reviews conducted by the Architectural and Engineering firms which design EPA's response actions.

In regard to the comment period and Community Relations program EPA has conducted the community relations activities as required by EPA guidance. The work plan was presented to the public in a meeting held May 29, 1984 and only local officials attended. If the community had requested more public information meetings or newsletters, the Agency would have responded. RI/FS was released in August 1985. The comment period was opened August 27 1985. Copies of the RI/FS were placed in the public library in Elkton, MD and at the YMCA near the site. A public meeting was held on September 5, 1985 and the comment period was closed September 20, 1985. At the request of the commentator and others, the close of the comment period was extended to September 26, 1985.

The Phase I RI/FS provides adequate information to proceed with the selection of a remedy at this time. The RI examined the site and defined certain problems that can be addressed at this time while the

remainder of the investigation for Phase II can continue. It is known that a release to the environment has occurred by the interconnection of the shallow ground water and the surface water seeps. It is also known that removal of any drummed or containerized wastes burried in the ground water aquifer is an effective source control measure. It is a common procedure to conduct additional RI/FS's at sites where additonal remedial measures may be needed. The NCP does not prohibit such actions. At this site it is apparent that a Phase II RI/FS is needed to collect additonal information to address possible deeper ground water contamination and soil contamiantion. The Phase I RI/FS does, however. provide the information required in the NCP for proceeding with the C-2 alternative at this time.

Commentator 2 - Rene Coulet du Gard
Comment submitted on September 5, 1985

COMMENT:

The commentator lives less than 1,000 feet from the site and is very concerned. The commentator would like to have the drums of waste removed at once, collect and treat the contaminated ground water and replace the soil. The commentator wants additional studies to be conducted, a thorough cleanup of the site and a great effort to warn the people living near the site of the danger of possible contamination.

RESPONSE:

Alternative C-2 calls for the removal of containerized wastes and the collection and treatment of contaminated shallow ground water. A decision on the appropriate action to take in response to the contaminated soil will be made at the completion of the Phase II RI/FS. EPA will continue to hold public meetings and implement a community relations program to inform the public of its activities at the site.

Commentator 3 - Ernest Little
Comment submitted September 15, 1985

COMMENT:

The commentator is concerned about the threats the site poses to humans and wildlife. The commentator recommends EPA actively persue the private parties responsible for the contamination and have the private parties pay for the cleanup.

RESPONSE:

EPA considered public health and wildlife impacts in arriving at its decision to select Alternative C-2. EPA has sent notice letters to a number of private parties who may be responsible for the site contamination

and will negotiate for a reasonable period of time with these parties to have them implement the C-2 alternative and conduct the Phase II RI/FS. EPA will not however, enter into protacted negotiations which will impede timely response actions. If EPA has to implement the response actions, EPA will at a later date persue cost recovery actions against private parties it believes are responsible for the site contamination.

Commentator 4 - Niles. Barton & Wilmer for Maryland Sand, Gravel and Stone Inc.
Comment submitted on September 19, 1984.

COMMENT:

The comment is essentially the same as made by commentator Number 1.

RESPONSE:

See response to commentator Number 1.

Commentator 5 - Dames & Moore for the PRP group
Comments submitted September 20, 1985 and September 26, 1985

COMMENTS:

The September 20. 1985 comments raise the same issues as were raised by commentator Number 1. The September 26, 1985 comments reiterate some of the same comments and raise the following specific comments regarding Alternative C-2:

1. The RI/FS (Phase I) does not contain the necessary site information to determine if Alternative C-2 can be implemented in a satisfactory manner.
2. The removal of "drums" may not be a feasible remedial measure.
3. No treatability studies were done to determine the feasibility of the treatment system proposed in Alternative C-2.
4. The proposed system for constructing the interceptor trenches is inconsistent with accepted practice: it is very costly and the sheet piling could potentially do more harm than good.
5. Alternative C-2 is grossly over designed.
6. Alternative C-2 is not cost effective.

RESPONSE:

See response to Comment Number 1 for a response to the September 20, 1985 comment. Responses to the six comments specific to Alternative C-2 are as follows:

1. During design and implementation of Alternative C-2 additonal field work will be done to determine the exact placement of and design of the interceptor trenches to insure that a barrier exists which will prevent the movement of contaminants through the trench and into the deeper aquifer. Existing data indicates that the shallow ground water is very contaminated and the interceptor trenches will be effective in collecting this shallow flow.

2. As discussed in the RAMP and the RI/FS report, existing information. aerial photos and interviews with individuals familiar with the site indicate there is a reasonable basis for believing drums and other containerized waste exist at the site. Existing data clearly shows that hazardous substances are migrating from the disposal areas, and, given the lack of any controls, such as liners. it is reasonable to anticipate the continued leaching of any hazardous substances remaining in the waste disposal area. Removal of drums or other containerized wastes will minimize the release of hazardous substances from the waste disposal areas. Drum excavation and offsite disposal is a common waste management method proven to be effective. The details on how the drums will be excavated and disposed of will be developed during design. If there are no drums containing hazardouse substances which pose a threat, no drum removal will occur (i.e., if the drums found contain only substances which are non-toxic or would otherwise not be considered a threat, there would be no need to remove them).

3. Existing data clearly showed that any ground water collected would have to be treated prior to discharge. Treatability studies will be considered during the design and if it appears that a lower cost treatment system can be designed which will meet the objectives of alternative C-2, EPA will encourage the design and implementation of such a system.

4. The proposed use of sheet pilings as side wall stabalizers will be thourghly considered during design. The commentators concerns will, of course. be considered during design of the interceptor trenches. If it is determined that an equally effective and less costly design can be implemented. EPA will encourage such a trench.

5. Alternative C-2 has not yet been designed. A conceptual program has been developed in the FS. EPA encourages value engineering during the design of remedial actions and the final design may differ from the FS so long as it meets the objectives of the conceptual program chosen by EPA.

6. Relative to the other remedial aactions considered in the FS Alternative C-2 is cost effective. The issues raised by the commentator relate to the design of Alternative C-2. EPA will encourage the design of the least costly system which will meet the objectives of the Alternative C-2's conceptual program.

State of Maryland

OFFICE OF ENVIRONMENTAL PROGRAMS
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

201 WEST PRESTON STREET • BALTIMORE, MARYLAND 21201 • AREA CODE 301 • 225-5647

TTY FOR DEAF: Balto. Area 383-7555
D.C. Metro 565-0451

Adele Wilzack, R.N., M.S., Secretary

William M. Eichbaum, Assistant Secretary

September 26, 1985

Mr. Stephen R. Wassersug, Director
Waste Management Division
Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

Re: Maryland Sand & Gravel

Dear Mr. Wassersug:

We have reviewed the draft Remedial Investigation/Feasibility Study (RI/FS) dated July 1985 and attended the public meeting held September 5, 1985 and we concur with EPA's preferred alternative C-2 from the feasibility study. Specifically, excavate the buried drums and grossly contaminated soils and collection of shallow groundwater, downgradient from Ponds P01, P02, P03 and the swamp, for treatment. This action should eliminate the surface seeps arising from the shallow groundwater. The Department understands that this is only a conceptual design and we will still require participation in the development and approval of the design specifications before opened for bids.

In addition to the scope of work proposed in C-2, the Department also requests expedient investigation of the western area to determine if any additional excavation will be necessary so that all excavation can be completed when a contractor is mobilized.

We concur with this partial solution and understand the final Record of Decision will follow the Phase 2 RI/FS. We look forward to cooperatively addressing remedial measures at the site upon completion of further studies.

Sincerely,

Ronald Nelson, Director
Waste Management Administration

RN/dlf

cc: Virginia R. Bailey, M.D., MPH
Charles R. Taylor, Esquire
Mr. John W. Koontz
Mr. John K. Chlada